

Schedule

NorthLab Pte Ltd
No. 38, Senoko Road,
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Certificate No. : LA-2007-0370-C

Issue No. : 11

Date : 04 July 2018

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FIELD OF TESTING : Calibration and Measurement

MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD / FREQUENCY (Hz)	CALIBRATION & MEASUREMENT CAPABILITY (CMC*)
A. ELECTRICAL		LAB ENVIRONMENTAL CONDITIONS: TEMPERATURE 23° ± 2° C HUMIDITY 55 ± 10 % R.H.
A1. Calibration of Resistance Measuring instruments	In house procedure EP12 : Oct 2012 (Issue 01, Amend 00)	
100 Ω to 1 kΩ 1 kΩ to 10 kΩ 10 kΩ to 100 kΩ 100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1000 MΩ 1GΩ to 10 GΩ 10GΩ to 100GΩ 100GΩ to 1000GΩ	YEW Decade Resistance Box 2793 03	0.87 Ω 8.2 Ω 0.088 kΩ 0.0059 MΩ 0.024 MΩ 0.25 MΩ 6.1 MΩ 0.062 GΩ 1.3 GΩ 12 GΩ
0 Ω to 10.99 Ω 11 Ω to 32.999 Ω 33 Ω to 109.999 Ω 110 Ω to 329.999 Ω 330 Ω to 1.09999 kΩ 1.1 kΩ to 3.29999 kΩ 3.3 kΩ to 10.9999 kΩ 11 kΩ to 32.9999 kΩ 33 kΩ to 109.999 kΩ 110 kΩ to 329.999 kΩ	In-house procedure EP16 : Oct 2012 (Issue 01, Amend 00) FLUKE 5520A	0.0019 Ω 0.0033 Ω 0.0056 Ω 0.014 Ω 0.041 Ω 0.14 Ω 0.44 Ω 0.0014 kΩ 0.0040 kΩ 0.015 kΩ

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330 k Ω to 1.09999 M Ω 1.1 M Ω to 3.29999 M Ω 3.3 M Ω to 10.9999 M Ω 11 M Ω to 32.9999 M Ω 33 M Ω to 109.999 M Ω 110 M Ω to 330 M Ω 330 M Ω to 1100 M Ω		0.045 k Ω 0.28 k Ω 0.0019 M Ω 0.013 M Ω 0.068 M Ω 1.8 M Ω 20 M Ω
1.9 Ω 10 Ω 19 Ω 100 Ω 190 Ω 1 k Ω 1.9 k Ω 10 k Ω 19 k Ω 100 k Ω 190 k Ω 1 M Ω 1.9 M Ω 10 M Ω 19 M Ω 100 M Ω	In-house procedure EP26 : Mar 2015 (Issue 01, Amend 00) FLUKE 5730A	0.00021 Ω 0.00028 Ω 0.00053 Ω 0.0012 Ω 0.0022 Ω 0.0000078k Ω 0.000015k Ω 0.000077k Ω 0.00015k Ω 0.0010k Ω 0.0019k Ω 0.000016M Ω 0.000040M Ω 0.00048M Ω 0.0011M Ω 0.012M Ω
A2. Calibration of Resistance Sourcing Instruments (2 wire or 4 wire) 1m Ω to 10 m Ω 10 m Ω to 100 m Ω 100 m Ω to 1000 m Ω 1 Ω to 10 Ω 10 Ω to 100 Ω 100 Ω to 1 k Ω 1 k Ω to 10 k Ω 10 k Ω to 100 k Ω	In-house procedure EP18 : Oct 2012 (Issue 01, Amend 00) WAVETEK 1271 & FLUKE 5520 A MFC	0.00038 m Ω 0.0027 m Ω 0.028 m Ω 0.36 m Ω 0.0026 Ω 0.025 Ω 0.25 Ω 0.0030 k Ω

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<p>100 kΩ to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ 100 MΩ to 1 GΩ</p>		<p>0.098 kΩ 0.00051 MΩ 0.058 MΩ 0.0046 GΩ</p>
<p>A3. Calibration of Milli- Ohmmeters</p> <p>0.001 Ω 0.01 Ω 0.1 Ω 1.0 Ω 1.9 Ω 19 Ω 100 Ω 1 kΩ</p>	<p>In-house procedure EP10 : Oct 2012 (Issue 01, Amend 00) CROPICO MTSI</p>	<p>0.84 $\mu\Omega$ 0.0061 mΩ 0.024 mΩ 0.24 mΩ 0.44 mΩ 4.4 mΩ 0.023 Ω 0.23 Ω</p>
<p>A4. Calibration of DC Voltage Measuring instruments</p> <p>0 to 220.0 mV 0.22 V to 2.2 V 2.2 V to 11 V 11.0 V to 22.0 V 22.0 V to 220.0 V 220.0 V to 1100.0 V</p> <p>1 kV to 30 kV</p>	<p>In-house procedures EP16 : Oct 2012 (Issue 01, Amend 00) EP26: Mar 2015 (Issue 01, Amend 00) FLUKE 5520A & FLUKE 5730A</p> <p>In-house procedure EP19 : Oct 2012 (Issue 01, Amend 00) Phenix KVM 100</p>	<p>0.0024mV 0.000014V 0.000049V 0.000097V 0.0013V 0.0089V</p> <p>1.5 % of reading</p>
<p>A5. Calibration of DC Voltage sourcing instruments</p> <p>0.1 mV to 1 mV 1 mV to 10 mV 10 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V</p>	<p>In-house procedure EP9 : Oct 2012 (Issue 01, Amend 00) WAVETEK 1271 DMM</p>	<p>0.00024 mV 0.00048 mV 0.0027 mV 0.000021 V 0.00017 V 0.0020 V</p>

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100 V to 1000 V 1 kV to 100 kV	In-house procedure EP3 : Oct 2012 (Issue 01, Amend 00) Phenix KVM 100 Kilo voltmeter	0.026 V 1.5 % of reading
A6. Calibration of AC Voltage measuring instruments	In-house procedure EP16 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A/Transmille 3041A EP26: Mar 2015 (Issue 01, Amend 00) FLUKE 5730A	
2.2 to 22 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 0.5 MHz to 1MHz	0.011 mV 0.0071 mV 0.0069 mV 0.010 mV 0.019 mV 0.039 mV 0.060 mV 0.096 mV
22 to 220 mV	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 0.5 MHz to 1 MHz	0.076 mV 0.033 mV 0.024 mV 0.040 mV 0.100 mV 0.19 mV 0.39 mV 0.75 mV
0.22 to 2.2 V	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz 300 kHz to 500 kHz 0.5 MHz to 1 MHz	0.00066 V 0.00025 V 0.00013 V 0.00019 V 0.00026 V 0.00096 V 0.0028 V 0.0047 V
2.2 to 22 V	10 Hz to 20 Hz 20 Hz to 40 Hz	0.0068 V 0.0025 V

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22 V to 220 V	0.04 kHz to 20 kHz	0.0013 V
	20 kHz to 50 kHz	0.0019 V
	50 kHz to 100 kHz	0.0024 V
	100 kHz to 300 kHz	0.0074 V
	300 kHz to 500 kHz	0.028 V
	0.5 MHz to 1 MHz	0.043 V
	220 V to 1100 V	10 Hz to 20 Hz
20 Hz to 40 Hz		0.027 V
0.04 kHz to 20 kHz		0.015 V
20 kHz to 50 kHz		0.023 V
50 kHz to 100 kHz		0.042 V
100 kHz to 300 kHz		0.25 V
300 kHz to 500 kHz		1.2 V
220 V to 1020 V	0.5 MHz to 1 MHz	2.1 V
	15 Hz to 50Hz	0.40 V
High Voltage Range :	50 Hz to 1 kHz	0.096 V
	1 kHz to 5 kHz	0.31 V
1 kV to 5 kV	5 kHz to 10 kHz	0.37 V
	In-house procedure EP19 : Oct 2012 (Issue 01, Amend 00) Phenix KVM 100 kilo voltmeter @ 50Hz	2.2 % of reading
A7. Calibration of AC Voltage sourcing instruments	In-house procedure EP9: Oct 2012 (Issue 01, Amend 00) Wavetek 1271DMM	
1 mV to 10 mV	40 Hz to 2 kHz	0.031 mV
	2 kHz to 20 kHz	0.050 mV
	20 kHz to 100 kHz	0.19 mV
10 mV to 100 mV	40 Hz to 2 kHz	0.045 mV
	2 kHz to 20 kHz	0.075 mV
	20 kHz to 100 kHz	0.24 mV
100 mV to 1 V	0.04kHz to 20kHz	0.00067 V
	20 kHz to 100 kHz	0.0017 V

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1 V to 10 V	0.04kHz to 20kHz 20 kHz to 100 kHz	0.0035 V 0.16 V
10 V to 100 V	0.04kHz to 20kHz 20 kHz to 100 kHz	0.0035 V 0.16 V
100 V to 1000 V	40 Hz to 2 kHz 2 kHz to 20 kHz	0.45 V 0.75 V
1 kV to 10 kV 10 kV to 100 kV	In-house procedure EP3 : Oct 2012 (Issue 01, Amend 00) Phenix KVM 100 50 Hz 50 Hz	2.2 % of reading 1.5 % of reading
A8. DC Current Measuring Instruments	In-house procedure EP16 : Jun 2015 (Issue 01, Amend 00) FLUKE 5520A/ Transmille 3041A EP26: Mar 2015 (Issue 01, Amend 00) FLUKE 5730A	0.017µA 0.000098mA 0.00095mA 0.012mA 0.00022A 0.0014 A 0.0070 A 0.02 A
A9. Calibration of DC Current Sourcing Instruments	In-house procedure EP9 : Oct 2012 (Issue 01, Amend 00)	
10 µA to 100 µA 0.1 mA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 0.1 A to 1 A 1 A to 3 A 3 A to 10 A 10 A to 100 A	WAVETEK 1271 Agilent 34401A FLUKE 189 Current shunt 100 A	0.012 µA 0.00012 mA 0.0012 mA 0.024 mA 0.00038 A 0.0050 A 0.06 A 0.17 A

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A10. Calibration of AC Current measuring instruments	In-house procedure EP16 : Jun 2015 (Issue 02, Amend 00) FLUKE 5220A/Transmile 3041A EP26: Mar 2015 (Issue 01, Amend 00) FLUKE 5730A	
33 μ A to 220 μ A	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 kHz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.084 μ A 0.054 μ A 0.037 μ A 0.09 μ A 0.36 μ A
33 μ A to 329 μ A	10 kHz to 30 kHz	6.6 μ A
0.22 mA to 2.2 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 kHz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.00070mA 0.00046mA 0.00032 mA 0.00065mA 0.0036mA
0.33 mA to 3.2999 mA	10 kHz to 30 kHz	0.039 mA
2.2 mA to 22 mA	10 Hz to 20 Hz 20 Hz to 40 Hz 0.04 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.0073mA 0.0047mA 0.0033mA 0.0059mA 0.034mA
3.3 mA to 32.999 mA	10 kHz to 30 kHz	0.16 mA
22 mA to 220 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.073mA 0.047mA 0.031mA 0.057mA 0.29mA
33 mA to 329.99 mA	10 kHz to 30 kHz	1.8 mA
0.22 A to 2.2 A	0.02 kHz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.00067A 0.0013A 0.018A

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2.2 A to 2.99999 A	10 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.0064 A 0.0023 A 0.022 A 0.092 A
3 A to 10.9999 A	45 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 5 kHz	0.010 A 0.015 A 0.38 A
11 A to 20.0 A	45 Hz to 99 Hz 100 Hz to 1 kHz 1 kHz to 5 kHz	0.035 A 0.042 A 0.72 A
20 A to 30.0 A	45 Hz to 99 Hz	0.052 A
A11. Calibration of AC Current sourcing instruments	In-house procedure EP9 : Oct 2012 (Issue 01, Amend 00) WAVETEK 1271, Fluke 189 & Agilent 34401A	
10 μ A to 100 μ A 0.1 mA to 1 mA 1mA to 10 mA 10 mA to 100 mA 0.1A to 1 A 1A to 3 A 3 A to 10 A	10 Hz to 5 kHz 10 Hz to 5 kHz 10 Hz to 5 kHz 10 Hz to 5 kHz 10 Hz to 5 kHz 45 Hz to 1 kHz 45 Hz to 1 kHz	0.053 μ A 0.00050 mA 0.0050 mA 0.05 mA 0.0027 A 0.0095 A 0.18 A
10 A to 100 A	In-house procedure EP4 : Oct 2012 (Issue 01, Amend 00) Current shunt 100A @ 50Hz	0.56 A
A12. Calibration of Electrical Power Meters Single Phase DC Power 1 W to 300 W 300 W to 3000 W 3 kW to 20 kW 20 kW to 550 kW	In-house procedure EP5 : Oct 2012 (Issue 01, Amend 00) FLUKE 5520A	0.04 % 0.04 % 0.09 % 0.65 %
Single Phase AC Power at p.f. = 1 1 W to 300 W 300 W to 3000 W 3 kW to 20 kW 20 kW to 550 kW	FLUKE 5520A 45 Hz to 65 Hz	0.17 % 0.16 % 0.12 % 0.76 %

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<p>Single Phase Power Factor (Phase Accuracy) at 55 to 65 Hz p.f. = 0 to 1 (phase angle = 0 ° to 90 °)</p>		0.30 °
<p>AC Three Phase Power at 50 Hz 0.045 kW to 5.4 kW 5.4 kW to 5.58 kW 5.58 kW to 270 kW 270 kW to 279 kW AC Three Phase Power Factor (0 ° to 360°)</p>	HC – PTC 9300 H	0.14 % of reading 0.13 % of reading 0.67 % of reading 0.68 % of reading
<p>A13. AC Power Sourcing Devices 12 W to 30 W 30 W to 150 W 150 W to 300 W 300 W to 600 W 600 W to 3000 W 3000 W to 12000 W</p>	<p>EP 24 YOKOGAWA POWER METER WT210 45 Hz to 65 Hz</p>	0.09 W 0.46 W 0.91 W 1.7 W 9.1 W 36 W
<p>Power Factor Sourcing Devices (Phase Accuracy) at 0 to 1 (Phase angle = 0 to 90 °)</p>	45 Hz to 65 Hz	0.27 °
<p>A14. Calibration of Frequency measuring instruments 100 mHz to 100 Hz 100 Hz to 1000 Hz 1 kHz to 10 kHz 10 kHz to 100 kHz 100 kHz to 1000kHz 1 MHz to 10 MHz 10.00 MHz to 600.0 MHz</p>	<p>In-house procedure EP25 : Jun 2015 (Issue 02, Amend 00) Universal Counter 53132A FLUKE 5520A & FLUKE 5820A</p>	0.001 Hz 0.004 Hz 0.04 Hz 0.4 Hz 0.01 kHz 0.1 kHz 0.01 MHz
<p>A15. Calibration of Frequency sourcing instruments 100 mHz to 1.0 Hz 1 Hz to 100 Hz 100 Hz to 1000 Hz 1 kHz to 10 kHz</p>	<p>In-house procedure EP25 : Jun 2015 (Issue 02, Amend 00) Universal Counter 53132A</p>	0.22 mHz 0.44 mHz 3.2 mHz 0.032 Hz

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<p>10 kHz to 100 kHz 100 kHz to 1000kHz 1 MHz to 10 MHz 10 MHz to 225 MHz</p> <p>A16. Calibration of Capacitance measuring instruments</p> <p>0.19 nF to 0.3999 nF 0.4 nF to 1.0999 nF 1.1 nF to 3.2999 nF 3.3 nF to 10.999 nF 11 nF to 32.999 nF 33 nF to 109.99 nF 110 nF to 329.99 nF</p> <p>0.33 µF to 1.0999 µF 1.1 µF to 3.2999 µF 3.3 µF to 10.999 µF 11 µF to 32.999 µF 33 µF to 109.99 µF 110 µF to 329.99 µF</p> <p>330 µF to 1.1 mF 1.1 mF to 3.2999 mF 3.3 mF to 10.9999 mF 11 mF to 32.9999 mF 33 mF to 110 mF</p> <p>A17. Calibration of Oscilloscopes</p> <p>a. AC Voltage Amplitude (1 mV to 130 V p-p)</p> <p>b. Bandwidth (Flatness) (0.07Vp-p to 5Vp-p) 50 kHz to 100 MHz 100 MHz to 300 MHz 300 MHz to 500 MHz 500 MHz to 600 MHz</p> <p>c. Timebase 20 ms to 2 ns 5s to 50 ms</p>	<p>In-house procedure EP14 : Oct 2012 (Issue 01, Amend 00)</p> <p>FLUKE 5520A @ 1 kHz</p> <p>FLUKE 5520A @ 100 Hz</p> <p>FLUKE 5520A @ 50 Hz</p> <p>In-house procedure EP2 : Oct 2012 (Issue 01, Amend 00) Multiproduct Calibrator Fluke 5820A</p>	<p>0.32 Hz 3.2 Hz 32 Hz 0.01 MHz</p> <p>0.014 nF 0.018 nF 0.032 nF 0.046 nF 0.22 nF 0.46 nF 1.4 nF</p> <p>4.6 nF 14 nF 46 nF 0.20 µF 0.70 µF 2.1 µF</p> <p>0.007 mF 0.022 mF 0.07 mF 0.32 mF 1.5 mF</p> <p>0.86 %</p> <p>5.4 % 5.6 % 6.6 % 7.0 %</p> <p>36 ppm 180 ppm</p>

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<p>d. Rise Time ≤ 300ps</p> <p>A18. Calibration of Time Interval Measuring Instruments (Lab & on-site) 1 s to 60 s 60 s to 1800 s 1800 s to 99999 s</p> <p>ON-SITE for A19 to A36</p> <p>A19. Resistance Measuring Instruments 0 Ω to 10.99 Ω 11 Ω to 32.999 Ω 33 Ω to 109.999 Ω 110 Ω to 329.999 Ω 330 Ω to 1.09999 kΩ 1.1 kΩ to 3.29999 kΩ 3.3 kΩ to 10.9999 kΩ 11 kΩ to 32.9999 kΩ 33 kΩ to 109.999 kΩ 110 kΩ to 329.999 kΩ 330 kΩ to 1.09999 MΩ 1.1 MΩ to 3.29999 MΩ 3.3 MΩ to 10.9999 MΩ 11 MΩ to 32.9999 MΩ 33 MΩ to 109.999 MΩ 110 MΩ to 330 MΩ 330 MΩ to 1100 MΩ</p> <p>A20. DC Voltage Measuring Instruments 0 to 329.9999 mV 0.33 V to 3.299999 V 3.3 V to 32.99999 V 33 V to 329.9999 V 330 V to 1020.000 V</p>	<p>In-house procedure EP17 : Oct 2012 (Issue 01, Amend 00)</p> <p>Universal Counter</p> <p>In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A</p> <p>In-house procedure SE06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A</p>	<p>120 ps</p> <p>0.001 s 0.007 s 0.37 s</p> <p>0.0019 Ω 0.0033 Ω 0.0056 Ω 0.014 Ω 0.041 Ω 0.14 Ω 0.44 Ω 0.0014 kΩ 0.0040 kΩ 0.015 kΩ 0.045 kΩ 0.28 kΩ 0.0019 MΩ 0.013 MΩ 0.068 MΩ 1.8 MΩ 20 MΩ</p> <p>0.0092 mV 0.000050 V 0.00051 V 0.0072 V 0.023 V</p>

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A21. AC Voltage Measuring Instruments	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A	
1.0 mV to 32.999 mV	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz	0.038 mV 0.014 mV 0.016 mV 0.046 mV 0.15 mV 0.36 mV
33 mV to 329.999 mV	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz	0.12 mV 0.066 mV 0.072 mV 0.15 mV 0.34 mV 0.85 mV
0.33 V to 3.29999 V	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 500 kHz	0.0012 V 0.00065 V 0.00080 V 0.0012 V 0.0028 V 0.014 V
3.3 V to 32.9999 V	10 Hz to 45 Hz 45 Hz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.012 V 0.0065 V 0.0099 V 0.014 V 0.036 V
33 V to 329.999 V	45 Hz to 1 kHz 1 kHz to 10 kHz 10 kHz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz	0.076 V 0.085 V 0.10 V 0.14 V 0.82 V
330 V to 1020 V	45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.37 V 0.31 V 0.37 V

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A22. DC Current measuring instruments 0 μ A to 329.999 μ A 0.33 mA to 3.29999 mA 3.3 mA to 32.9999 mA 33 mA to 329.999 mA 0.33 A to 1.09999 A 1.1 A to 2.99999 A 0 A to 10.9999 A 11 A to 20.5 A	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A	0.080 μ A 0.00044 mA 0.0041 mA 0.041 mA 0.00030 A 0.0014 A 0.0070 A 0.026 A
A23. AC Current measuring instruments 0.029 mA to 0.32999 mA	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A 10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	0.88 μ A 0.69 μ A 0.60 μ A 1.3 μ A 3.3 μ A 6.6 μ A
0.33 mA to 3.2999 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	0.0080 mA 0.0050 mA 0.0040 mA 0.0080 mA 0.019 mA 0.039 mA
3.3 mA to 32.999 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	0.071 mA 0.037 mA 0.018 mA 0.033 mA 0.080 mA 0.16 mA

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33 mA to 329.99 mA	10 Hz to 20 Hz 20 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz 10 kHz to 30 kHz	0.71 mA 0.37 mA 0.18 mA 0.44 mA 0.88 mA 1.8 mA
0.33 A to 1.09999 A	10 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.0024 A 0.00080 A 0.0088 A 0.038 A
1.1 A to 2.99999 A	10 Hz to 45 Hz 45 Hz to 1 kHz 1 kHz to 5 kHz 5 kHz to 10 kHz	0.0064 A 0.0023 A 0.022 A 0.092 A
3 A to 10.9999 A	45 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 5 kHz	0.010 A 0.015 A 0.38 A
11 A to 20.5 A	45 Hz to 100 Hz 100 Hz to 1 kHz 1 kHz to 5 kHz	0.035 A 0.042 A 0.72 A
A24. Electrical Power Meters	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A	
Single Phase DC Power		
1 W to 300 W		0.04 %
300 W to 3000 W		0.04 %
3 kW to 20 kW		0.09 %
20 kW to 550 kW		0.65 %
Single Phase AC Power at p.f. = 1	45 Hz to 65 Hz	
1 W to 300 W		0.17 %
300 W to 3000 W		0.16 %
3 kW to 20 kW		0.12 %
20 kW to 550 kW		0.76 %

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Single Phase Power Factor (Phase Accuracy) at 55 to 65 Hz p.f. = 0 to 1 (phase angle = 0 to 90)		0.30 °
A25. Frequency measuring instruments 0.01 Hz to 119.99 Hz 120.0 Hz to 1199.9 Hz 1.200 kHz to 11.999 kHz 12.00 kHz to 119.99 kHz 120 kHz to 1199.9 kHz 1.200 MHz to 2.000 MHz	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A	0.001 Hz 0.1 Hz 0.001 kHz 0.01 kHz 0.1 kHz 0.001 MHz
A26. Capacitance measuring instruments 0.19 nF to 0.3999 nF 0.4 nF to 1.0999 nF 1.1 nF to 3.2999 nF 3.3 nF to 10.999 nF 11 nF to 32.999 nF 33 nF to 109.99 nF 110 nF to 329.99 nF 0.33 µF to 1.0999 µF 1.1 µF to 3.2999 µF 3.3 µF to 10.999 µF 11 µF to 32.999 µF 33 µF to 109.99 µF 110 µF to 329.99 µF 330 µF to 1.1 mF 1.1 mF to 3.2999 mF 3.3 mF to 10.9999 mF 11 mF to 32.9999 mF 33 mF to 110 mF	In-house procedure SE 06 : Jun 2015 (Issue 02, Amend 00) FLUKE 5520A @ 1 kHz @ 100 Hz @ 50 Hz	0.014 nF 0.018 nF 0.032 nF 0.046 nF 0.22 nF 0.46 nF 1.4 nF 4.6 nF 14 nF 46 nF 0.20 µF 0.70 µF 2.1 µF 0.007 mF 0.022 mF 0.07 mF 0.32 mF 1.5 mF

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<p>A27. Capacitance measuring Instruments</p> <p>10 pF to 110 pF 110 pF to 1000 pF 1 nF to 10 nF 10 nF to 100 nF 100 nF to 1000 nF 1 μF to 10 μF</p>	<p>In-house procedure SE 01 : Oct 2012 (Issue 01, Amend 00)</p>	<p>3.2 pF 13 pF 0.13 nF 1.3 nF 13 nF 0.13 μF</p>
<p>A28. Inductance Measuring Instruments</p> <p>10 μH to 100 μH 100 μH to 1000 μH 1 mH to 10 mH 10 mH to 100 mH 100 mH to 1000 mH 1 H to 10 H</p>	<p>In-house procedure SE 01 : Oct 2012 (Issue 01, Amend 00)</p>	<p>2.5 μH 25 μH 0.25 mH 2.5 mH 25 mH 0.25 H</p>
<p>A29. DC Voltage Sourcing Instruments</p> <p>1 mV to 100.0 mV 100 mV to 1.0 V 1.0V to 10V 10 V to 100 V 100 V to 1000 V 1 kV to 100 kV</p>	<p>In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00)</p> <p>In-house procedure SE 03 : Oct 2012 (Issue 01, Amend 00)</p>	<p>16 μV 85 μV 0.82 mV 0.010 V 0.084 V 1.6 %</p>
<p>A30. AC Voltage Sourcing Instruments</p> <p>1 mV to 100.0 mV</p> <p>100 mV to 1.0 V</p>	<p>In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00)</p> <p>3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz</p> <p>3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz</p>	<p>1.5 mV 0.55 mV 0.15 mV 0.27 mV 0.96 mV 5.5 mV</p> <p>0.015 V 0.0054 V 0.0016 V 0.0026 V 0.0096 V 0.055 V</p>

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1 V to 10.0 V	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	0.15 V 0.054 V 0.014 V 0.027 V 0.097 V 0.55 V
10 V to 100.0 V	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	1.5 V 0.54 V 0.14 V 0.25 V 0.97 V 5.5 V
100 V to 750.0 V	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 20 kHz 20 kHz to 50 kHz 50 kHz to 100 kHz 100 kHz to 300 kHz	11 V 4 V 0.99 V 1.8 V 7.2 V 41 V
1 kV to 100 kV	In-house procedure SE 03 : Oct 2012 (Issue 01, Amend 00) 20 Hz to 1000 Hz	1.6 %
A31. DC Current Sourcing Instruments 50 μ A to 500 μ A 0.5 mA to 5 mA 1 mA to 10.0 mA 10 mA to 100.0 mA 100 mA to 1.0 A 1 A to 3.0 A 3 A to 100 A	In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00) In-house procedure SE 04 : Oct 2012 (Issue 01, Amend 00)	1.4 % 0.34 % 11 μ A 98 μ A 1.5 mA 5.5 mA 0.58 A
A32. AC Current Sourcing Instruments	In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00)	
50 μ A to 500 μ A	20 Hz to 45 Hz 45 Hz to 20 kHz	1.3 % 0.94 %
0.5 mA to 5 mA	20 Hz to 45 Hz 45 Hz to 20 kHz	1.2 % 0.90 %
5 mA to 50 mA	20 Hz to 45 Hz 45 Hz to 20 kHz	1.2 % 0.92 %

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50 mA to 400 mA	5 kHz to 20 kHz	2.6 %
1 mA to 100 mA	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 5 kHz	1.2 mA 0.43 mA 0.24 mA
100 mA to 1.0 A	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 5 kHz	12 mA 4 mA 1.8 mA
1 A to 3.0 A	3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 5 kHz	0.04 A 14 mA 7.5 mA
3 A to 100 A	In-house procedure SE 03 : Oct 2012 (Issue 01, Amend 00) 50 Hz	0.80 A
A33. Resistance Sourcing Instruments 0.1 Ω to 100.0 Ω 100 Ω to 1.0 k Ω 1 k Ω to 10.0 k Ω 10 k Ω to 100.0 k Ω 100 k Ω to 1.0 M Ω 1 M Ω to 10.0 M Ω 10 M Ω to 100.0 M Ω	In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00)	0.061 Ω 0.0006 k Ω 0.006 k Ω 0.06 k Ω 0.0006 M Ω 0.0082 M Ω 1.5 M Ω
A34. Frequency Sourcing Instruments 100 mV to 750 V	In-house procedure SE 02 : Oct 2012 (Issue 01, Amend 00) 3 Hz to 5 Hz 5 Hz to 10 Hz 10 Hz to 40 Hz 40 Hz to 500 Hz 500 Hz to 5 kHz 5 kHz to 50 kHz 50 kHz to 300 kHz	0.0062 Hz 0.0062 Hz 0.014 Hz 0.058 Hz 0.00058 kHz 0.0058 kHz 0.035 kHz
A35. Capacitance Sourcing Instruments 100 nF to 1000 nF 1000 nF to 10 μ F 10 μ F to 100 μ F 100 μ F to 1000 μ F 1000 μ F to 9999 μ F		17 nF 0.17 μ F 1.7 μ F 54 μ F 150 μ F

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A36. Calibration of Time Interval Measuring Instruments 1 s to 60 s 60 s to 1800 s 1800 s to 99999 s	In-house procedure SE05 : Jul 2014 (Issue 01, Amend 00)Stopwatch	0.009 s 0.37 s 1.4 s
B. MECHANICAL	LAB ENVIRONMENTAL CONDITIONS: TEMPERATURE 20° ± 2° C HUMIDITY 55 ± 10 % R.H.	
B1. Absolute pressure instruments Type Absolute Gauge, Absolute Recorder, Calibrator, Digital Indicator, Manometer, Transmitter/ Transducer and Barometer		
Range	In-house procedure	
a) 1 to 65 mbar absolute	P02 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.29 mbar absolute
b) 0.005 to 2 bar abs	P02 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0020 bar abs
c) 15 to 1000 psi absolute	P04 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.017% of Rdg + 0.047psi abs
d) 0.2 to 35 bar abs	P04 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.019% of Rdg + 0.00090 bar abs
e) 0.1 to 2000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.31 psi abs
f) 2000 to 4000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.62 psi abs
g) 4000 to 6000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.93 psi abs
h) 6000 to 10000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	1.6 psi abs

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i) 10000 to 18000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	2.8 psi abs
j) 18000 to 30000 psi abs	P18 (11 Nov 2016, Issue No. 01, Amend No. 01)	4.8 psi abs
k) 100 to 20000 psi abs	P08 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.022% of Rdg + 0.022psi
B2. Pneumatic/Oxygen/Non-Oil pressure Instruments Oxygen Service Instruments and Oil- Free Instrument. Pneumatic Gauges Calibration, Digital Indicators, Pressure Switches, Data Loggers, Manometers, Transmitter/ Transducer, Peak Pressure Indicators, Magnehelic Gauges & Pressure Recorders		
<u>Range</u>	In-house procedure	
a) -2 to 2 inH ₂ O	P06 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0069 inH ₂ O
b) -7 to 7 kPa	P05 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0072 kPa
c) 0 to 5 psi	P05 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0039 psi
d) 5 to 410 inH ₂ O	P26 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.020% of Rdg + 0.007 inH ₂ O
e) 15 to 1000 psi	P04 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.021% of Rdg + 0.00041 psi
f) 0 to 20 bar	P05 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.015 bar
g) 0 to 2 kg/cm ²	P05 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.00040 kg/cm ²

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h) 0.1 to 35 bar	P04 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.020% of Rdg. + 0.0042 bar
i) 10 to 10000 psi use Water Separator	P03 (12 Apr 2017, Issue No. 01, Amend No. 02)	0.024% of Rdg + 0.020 psi
B3. Vacuum Instruments Type Digital Indicators, Torr Meters, Vacuum Gauges, Manometers, Transmitter/Transducer, Calibrators and Magnehelic Gauges and Vacuum Switch		
Range	In-house procedure	
a) -5 to 410 inH ₂ O	P26 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.10 inH ₂ O
b) 0 to -1 kg/cm ²	P05 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.00040 kg/cm ²
c) 0 to -1 bar	P04 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0003 bar
B4. Differential pressure instruments Type Pneumatic Differential Gauges/ Switches, Pneumatic Differential Indicators, Transmitter/ Transducer and Magnehelic Gauge		
Range	In-house procedure	
a) 0 to 2 inH ₂ O	P06 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0069 inH ₂ O
b) 0 to 7 kPa	P06 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.0072 kPa
c) 5 to 410 inH ₂ O	P26 (11 Nov 2016, Issue No. 01, Amend No. 01)	0.020% of Rdg + 0.007 inH ₂ O

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<p>B5. Hydraulic Pressure instruments</p> <p><u>Type</u> Oil Pressure Gauges, Distilled Water Pressure Gauges, Calibrator, Digital Indicators, Data Loggers, Controllers, Manometers, Pressure Switches, Transmitter/ Transducer and Peak Pressure Indicators</p> <p><u>Range</u></p> <p>a) 10 to 20000 psi</p> <p>b) 0 to 2000 psi</p> <p>c) 2000 to 4000 psi</p> <p>d) 4000 to 6000 psi</p> <p>e) 6000 to 10000 psi</p> <p>f) 10000 to 18000 psi</p> <p>g) 18000 to 30000 psi</p> <p>h) 30000 to 60000 psi</p>	<p>In-house procedure P08 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P18 (11 Nov 2016, Issue No. 01, Amend No. 01)</p> <p>P25 (11 Nov 2016, Issue No. 01, Amend No. 01)</p>	<p>0.021% of Rdg + 0.023 psi</p> <p>0.31 psi</p> <p>0.62 psi</p> <p>0.93 psi</p> <p>1.6 psi</p> <p>2.8 psi</p> <p>4.8 psi</p> <p>0.024% of Rdg + 0.58 psi</p>
<p>B6. Deadweight Testers (DWT)</p> <p><u>Type</u> Gas DWT, Hydraulic Oil DWT and Distilled Water DWT</p> <p><u>Range</u> 10 to 1000 psi 100 to 20000 psi</p>	<p>In-house procedure P07 (28 Oct 2013, Issue No. 01, Amend No. 00)</p>	<p>0.014% of reading 0.097% of reading</p>

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<p>B7. Force Gauge (with bourdon tube element)</p> <p><u>Range</u></p> <p>a) 15 to 1000 psi b) 0.2 to 35 bar c) 5 to 410 inH2O d) 10 to 20000 psi e) 0 to 2000 psi f) 2000 to 4000 psi g) 4000 to 6000 psi h) 6000 to 10000 psi i) 10000 to 18000 psi j) 18000 to 30000 psi k) 1000 to 60000 psi</p>	<p>In-house procedure P11 (11 Nov 2016, Issue No. 01, Amend No. 01)</p>	<p>0.021% of Rdg + 0.00041 psi 0.020% of Rdg +0.0042 bar 0.020% of Rdg + 0.007 inH2O 0.021% of Rdg + 0.023 psi 0.31 psi 0.62 psi 0.93 psi 1.6 psi 2.8 psi 4.8 psi 0.024% of Rdg + 0.58 psi</p>
<p>B8. Tachometer (Non-contact/ Stroboscope)</p> <p><u>Range</u></p> <p>a) 6 to 99 rpm b) 100 to 999 rpm c) 1000 to 4999 rpm d) 5000 to 9999 rpm e) 10000 to 49999 rpm f) 50000 to 99999 rpm</p> <p>Tachometer (Contact type)</p> <p><u>Range</u></p> <p>a) 30 to 99 rpm b) 100 to 999 rpm c) 1000 to 4999 rpm d) 5000 to 9999 rpm</p>	<p>In-house procedure P19 (01 May 2016, Issue No. 01, Amend No. 02)</p> <p>In-house procedure P19 (01 May 2016, Issue No. 01, Amend No. 02)</p>	<p>0.0094 rpm 0.081 rpm 0.11 rpm 0.12 rpm 1.1 rpm 1.2 rpm</p> <p>0.23 rpm 0.52 rpm 2.0 rpm 2.0 rpm</p>

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<p>B9. On-Site Calibration of Pressure Measuring Instruments, Pressure Gauges, Calibrators, Data, Loggers, Manometers, Recorders, Pressure Switches, Pressure Transmitters/ Transducers and Controllers</p> <p><u>Range</u></p> <p>(a) 0.005 to 2 bar absolute (b) 0 to -14.5 psi (c) -25.4 to 25.4 mmH₂O (d) -254 to 254 mmH₂O (e) 0 to 5 psi (f) 0 to 14.5 psi (g) 0 to 2 bar (h) -1 to 20 bar (i) 0 to 1000 psi (j) 1000 to 5000 psi (k) 5000 to 10000 psi (l) 10000 to 20000 psi (m) 20000 to 45000 psi</p>	<p>In-house procedure SP01 (11 Nov 2016, Issue No. 01, Amend No. 01)</p>	<p>0.0023 bar absolute 0.021 psi 0.15 mmH₂O 0.20 mmH₂O 0.0039 psi 0.021 psi 0.0025 bar 0.023 bar 0.76 psi 3.9 psi 9.0 psi 15 psi 110 psi</p>
<p>C. TEMPERATURE</p>	<p>LAB ENVIRONMENTAL CONDITIONS: TEMPERATURE 23° ± 2° C HUMIDITY 55 ± 10 % R.H.</p>	
<p>C1. Contact temperature sensors with indicators</p> <p><u>Range</u></p> <p>-80 °C to -40 °C -40 °C to 5 °C 5 °C to 95 °C 95 °C to 150 °C 150 °C to 250 °C 250 °C to 400 °C 400 °C to 500 °C 500 °C to 600 °C 600 °C to 650 °C</p>	<p>In-house Procedure T01 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.1 °C 0.05 °C 0.05 °C 0.07 °C 0.21 °C 0.24 °C 1.6 °C 2.4 °C 3.0 °C</p>

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<p>C2. Contact temperature sensors without Indicators</p> <p><u>Range</u> - 80 °C to -40 °C -40 °C to 5 °C 5 °C to 95 °C 95 °C to 150 °C 150 °C to 250 °C 250 °C to 400 °C 400 °C to 500 °C 500 °C to 600 °C 600 °C to 650 °C</p>	<p>In-house Procedure T03 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.1 °C 0.05 °C 0.05 °C 0.08 °C 0.21 °C 0.24 °C 1.6 °C 2.4 °C 3.0 °C</p>
<p>C3. T/C Sensor with and without Indicators</p> <p><u>Range</u> - 80 °C to 150 °C 150 °C to 400°C 400 °C to 500°C 500 °C to 600°C 600 °C to 650°C 650 °C to 1200°C</p>	<p>In-house Procedure T01, 03: Oct 2012 (Issue 01, Amend 00)</p>	<p>0.24 °C 0.32 °C 1.6 °C 2.4 °C 3.0 °C 4.9 °C</p>
<p>C4. Temperature Bath</p> <p><u>Range</u> -200 °C to 650°C 650 °C to 1000°C 1000 °C to 1200 °C</p>	<p>In-house Procedure T04 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.16 °C 3.2 °C 3.4 °C</p>
<p>C5. RTD Simulator / Calibrator</p> <p><u>Range</u> -200 °C to -80 °C -80 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C 630 °C to 800 °C</p>	<p>In-house Procedure T05 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.037 °C 0.072 °C 0.10 °C 0.12 °C 0.16 °C 0.19 °C</p>

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<p>C6. TC Simulator / Calibrator, TC Indicator without sensor</p> <p>Type J</p> <p>-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C</p> <p>Type K</p> <p>-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C</p> <p>Type R</p> <p>0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C</p> <p>Type S</p> <p>0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C</p> <p>Type T</p> <p>-250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C</p>	<p>In-house Procedure T05 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.34 °C 0.23 °C 0.21 °C 0.22 °C 0.3 °C</p> <p>0.48 °C 0.35 °C 0.33 °C 0.41 °C 0.55 °C</p> <p>1.09 °C 0.96 °C 0.95 °C 0.88 °C</p> <p>1.0 °C 0.96 °C 0.97 °C 1.0 °C</p> <p>0.78 °C 0.34 °C 0.27 °C 0.27 °C</p>

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<p>Type E</p> <p>-250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C</p> <p>Type N</p> <p>-200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C</p>		<p>0.59 °C 0.21 °C 0.19 °C 0.22 °C 0.27 °C</p> <p>0.47 °C 0.5 °C 0.48 °C 0.48 °C 0.53 °C</p>
<p>C7. RTD Indicator without sensor</p> <p>Range</p> <p>-200 °C to -80 °C -80 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C 630 °C to 800 °C</p>	<p>In-house Procedure T02 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.058 °C 0.081 °C 0.10 °C 0.12 °C 0.14 °C 0.27 °C</p>
<p>C8. Thermohygrograph / Thermohygrometer/ Air Probes</p> <p><u>Range</u></p> <p>(0 °C to 19 °C) 5 % rh to 50 % rh 50 % rh to 60 % rh 60 % rh to 70 % rh 70 % rh to 95 % rh</p> <p>(19 °C to 21 °C) 5 % rh to 50 % rh 50 % rh to 60 % rh 60 % rh to 70 % rh 70 % rh to 95 % rh</p>	<p>In-house Procedure T09 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.22 °C 1.9 % rh 2.1 % rh 2.5 % rh 3.3 % rh</p> <p>0.22 °C 1.4 % rh 1.7 % rh 1.9 % rh 2.5 % rh</p>

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(21 °C to 25 °C) 40 % to 95 % RH	In-house procedure T06 : Oct 2012 (Issue 01, Amend 01)	0.48 °C 2.6 % rh
(25 °C to 40 °C) 30 % to 95 % RH		0.48 °C 2.6 % rh
(40 °C to 50 °C) 10 % to 95 % RH		0.48 °C 2.5 % rh
(50 °C to 70 °C) 10 % to 95 % RH		0.46 °C 2.6 % rh
-40 °C to 0 °C 70 °C to 100 °C		1.1 °C 1.1 °C
C9. Calibration of dew / frost point Meters, transmitters -75 °C Cfp to -60 °C Cfp -60 °C Cfp to -40 °C Cfp -40 °C Cfp to -20 °C Cfp -20 °C Cfp to +20 °C Cfp	In-house Procedure T09 : Oct 2012 (Issue 01, Amend 00)	0.61 °C fp 0.42 °C fp 0.38 °C fp 0.34 °C dp / fp
C10. Site Calibration of Contact temperature sensors with indicators -20 °C to 150 °C 150 °C to 400 °C 400 °C to 500 °C 500 °C to 600 °C 600 °C to 650 °C	In-house Procedure ST01 : Oct 2012 (Issue 01, Amend 00)	0.28 °C 1.0 °C 1.6 °C 2.4 °C 3.0 °C
C11. Site Calibration of Contact temperature sensors without Indicators -20 °C to 150 °C 150 °C to 400 °C 400 °C to 500 °C 500 °C to 600 °C 600 °C to 650 °C	In-house procedure ST03 : Oct 2012 (Issue 01, Amend 00)	0.27 °C 1.1 °C 1.6 °C 2.4 °C 3.0 °C

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<p>C12. Site Calibration of T/C Sensors with Indicators</p> <p>650 °C to 1000 °C 1000 °C to 1200 °C</p>	<p>In-house Procedure ST01 : Oct 2012 (Issue 01, Amend 00)</p>	<p>3.3 °C 4.4 °C</p>
<p>C13. Site Calibration of T/C Sensors without Indicators</p> <p>650 °C to 1000 °C 1000 °C to 1200 °C</p>	<p>In-house Procedure ST03 : Oct 2012 (Issue 01, Amend 00)</p>	<p>3.3 °C 4.4 °C</p>
<p>C14. Site Calibration of Temperature Baths</p> <p>-200 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1200 °C</p>	<p>In-house Procedure ST04 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.24 °C 3.7 °C 4.8 °C</p>
<p>C15. Site Calibration of RTD Indicator without sensor</p> <p>Range</p> <p>-200 °C to -80 °C -80 °C to 100 °C 100 °C to 300 °C 300 °C to 400 °C 400 °C to 630 °C 630 °C to 800 °C</p>	<p>In-house Procedure ST02 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.046 °C 0.07 °C 0.092 °C 0.12 °C 0.14 °C 0.24 °C</p>
<p>C16. Site Calibration of T/C Simulator / Calibrator, TC Indicator without sensor</p> <p>Type J</p> <p>-210 °C to -100 °C -100 °C to -30 °C -30 °C to 150 °C 150 °C to 760 °C 760 °C to 1200 °C</p>	<p>In-house Procedure ST02 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.48 °C 0.34 °C 0.30 °C 0.34 °C 0.40 °C</p>

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC*)
Type K -200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 1000 °C 1000 °C to 1372 °C		0.57 °C 0.38 °C 0.30 °C 0.47 °C 0.68 °C
Type R 0 °C to 250 °C 250 °C to 400 °C 400 °C to 1000 °C 1000 °C to 1767 °C		1.3 °C 1.1 °C 1.0 °C 1.1 °C
Type S 0 °C to 250 °C 250 °C to 1000 °C 1000 °C to 1400 °C 1400 °C to 1767 °C		1.3 °C 1.1 °C 1.1 °C 1.2 °C
Type T -250 °C to -150 °C -150 °C to 0 °C 0 °C to 120 °C 120 °C to 400 °C		1.1 °C 0.42 °C 0.33 °C 0.32 °C
Type E -250 °C to -100 °C -100 °C to -25 °C -25 °C to 350 °C 350 °C to 650 °C 650 °C to 1000 °C		0.85 °C 0.30 °C 0.28 °C 0.28 °C 0.36 °C
Type N -200 °C to -100 °C -100 °C to -25 °C -25 °C to 120 °C 120 °C to 410 °C 410 °C to 1300 °C		0.80 °C 0.58 °C 0.55 °C 0.54 °C 0.64 °C

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MEASURED QUANTITIES / INSTRUMENTS / RANGE TO BE CALIBRATED	METHOD	CALIBRATION & MEASUREMENT CAPABILITY (CMC*)
<p>C17. Calibration of Temperature and Humidity Controlled Enclosures in Permanent Laboratory & at site</p> <p>0 °C to 15 °C 5 % rh to 10 % rh</p> <p>15 °C to 30 °C 10 % rh to 90 % rh</p> <p>0 °C to 70 °C 5 % rh to 95 % rh</p>	<p>In-house Procedure ST04 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.30 °C 2.1 % rh</p> <p>0.65 °C 4.2% rh</p> <p>0.69 °C 4.2 % rh</p>
<p>C18. Calibration of Temperature Controlled Enclosures in Permanent Laboratory & at site</p> <p>-80 °C to -40 °C -40 °C to 50 °C 50 °C to 100 °C 100 to 150 °C 150 to 370 °C 370 to 1000 °C 1000 to 1200 °C</p>	<p>In-house Procedure ST04 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.75 °C 0.34 °C 0.61 °C 0.96 °C 3.6 °C 9.0 °C 7.7 °C</p>
<p>C19. Liquid-In-Glass Thermometer Least scale division: 0.02°C</p> <p>-75 °C to -20 °C -20 °C to 150 °C 150 °C to 250 °C</p>	<p>In-house Procedure T08 : Oct 2012 (Issue 01, Amend 00)</p>	<p>0.48 °C 0.36 °C 0.76 °C</p>
<p>C20. Infrared Thermometers/ Thermal Imagers</p> <p>0 °C to 50 °C 50 °C to 150 °C 150 °C to 350 °C</p>		<p>0.52 °C 0.96 °C 1.8 °C</p>

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

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Approved Signatories:

- | | |
|------------------------------|---|
| Mr A. Murugappan | - All except item C9. |
| Mr Ramanathan Muthu | - Category A only. |
| Ms Shimna Sreedhar | - Category A and C. |
| Mr Muthiah Meyyappan | - Category B only. |
| Mr Hafeez Abdul | - Items B5 & C1 only. |
| Mr Pavani Neela Lohit | - Category A and C. |
| Mr Sreejith Radhakrishnan | - Category B only. |
| Mr Lim Hon Kiong | - Item B5 only. |
| Mr Mohanakrishnan Sreesankar | - Category C only, except items C3, C9 and C10. |

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 calibrations. 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.