

NO: SAMM 218

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LABORATORY LOCATION:  
(PERMANENT LABORATORY)
**PROCAL SERVICES SDN. BHD.**  
**2, LORONG PERDA UTAMA 12**  
**BANDAR PERDA**  
**14000 BUKIT MERTAJAM, PENANG**  
**MALAYSIA**


FIELD(S) OF CALIBRATION:

**DIMENSIONAL, MASS, FORCE AND TORQUE,**  
**PRESSURE, TEMPERATURE**

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2005 (ISO/IEC 17025:2005).

This 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 test results and 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 (see Joint ISO-ILAC-IAF Communiqué dated April 2017).

\* The expanded uncertainties are based on an estimated confidence probability of approximately 95% and have a coverage factor of  $k=2$  unless stated otherwise.

**SCOPE OF CALIBRATION: DIMENSIONAL**

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Caliper External	0 mm to 600 mm	0.015 mm	Calibrated using gauge block as based on ISO 13385:2011
External Micrometer 50mm frame 75mm frame 100mm frame 150mm frame 200mm frame 300mm frame	0 mm to 25 mm	1.3 $\mu$ m 1.4 $\mu$ m 1.5 $\mu$ m 1.5 $\mu$ m 2.0 $\mu$ m 2.2 $\mu$ m 2.5 $\mu$ m	Calibrated using gauge block as based on ISO3611:2010
Height Gauge	0 mm to 300 mm	4 $\mu$ m	Calibrated using gauge block as standards based on ISO 13225:2012
	300 to 600 mm	6 $\mu$ m	
Dial Test Indicator	0 mm to 5 mm	2 $\mu$ m	Calibrated using dial gauge calibrator as standards based on BS2795:1981

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## SCOPE OF CALIBRATION: DIMENSIONAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Dial Gauge	0 mm to 25 mm	2 $\mu$ m	Calibrated using dial gauge calibrator as standards based on BS907:2008
Digital Indicator	0 mm to 50 mm	2 $\mu$ m	Calibrated using dial gauge Calibrator as standards according to BS907:2008
Feeler Gauge	0 mm to 3 mm	0.3 $\mu$ m	Contact method using SLYVAC digital linear gauge according to JIS B7524:2008
Coating Thickness Film	0 mm to 2 mm	0.3 $\mu$ m	SLYVAC digital linear gauge according to BS5411:1980
Diameter Pin Gauge (Diameter Only)	0 mm to 25 mm	0.7 $\mu$ m	Calibrated by using UMM
Plain Plug Gauge (Diameter Only)	25 mm to 100 mm	1.1 $\mu$ m	Calibrated by using ULM
Plain Ring Gauge (Diameter Only)	0 mm to 50 mm	3.1 $\mu$ m	Calibrated by using UMM
	50 mm to 100 mm	2.0 $\mu$ m	Calibrated using ULM
Gauge Block Set Grade '0' and lower	0 mm to 25 mm	0.08 $\mu$ m	Calibrated using gauge block comparison method according to ISO3650:1998
	Above 25 mm to 50 mm	0.09 $\mu$ m	
	Above 50 mm to 75 mm	0.10 $\mu$ m	
	Above 75 mm to 100 mm	0.12 $\mu$ m	
Thread Plug Gauge (Major diameter and simple pitch diameter)	0 mm to 70 mm	0.001 mm	Calibrated using ULM
Thread Ring Gauge (Major diameter and simple pitch diameter)	3mm to 70mm	0.0025 mm	Calibrated using ULM
Radius Gauge	0.5 mm to 100 mm	0.008 mm	Calibrated using Profile Projector
Dial/Digital Thickness Gauge	0 mm to 25 mm	0.002 mm	Calibrated using Gauge Blocks
Setting Rod	0 to 25 mm	0.0005 mm	Calibrated using ULM
	25 mm to 100 mm	0.001 mm	
	100 mm to 200 mm	0.002 mm	
	200 mm to 300 mm	0.0028 mm	

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## Signatory:

1. Chan Siew Ling

# Schedule

Issue date: 7 November 2017  
Valid until: 8 October 2020



MS ISO/IEC 17025

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**SCOPE OF CALIBRATION: DIMENSIONAL**

**SITE: CATEGORY I**

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Profile Projector	0mm to 300mm	3.9 $\mu$ m	Calibrated using standard glass scale according to JIS7184:1999

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## SCOPE OF CALIBRATION: MASS

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Standard Weights	1mg	0.2mg	Calibrated using standard weights and balances as comparator using ABA Weighing Scheme
	2mg	0.2mg	
	5mg	0.2mg	
	10mg	0.2mg	
	20mg	0.2mg	
	50mg	0.2mg	
	100mg	0.2mg	
	200mg	0.2mg	
	500mg	0.2mg	
	1g	0.2mg	
	2g	0.2mg	
	5g	0.2mg	
	10g	0.2mg	
	20g	0.2mg	
	50g	0.2mg	
	100g	0.2mg	
	200g	0.3mg	
	500g	2mg	
	1kg	16mg	
	2kg	17mg	
5kg	22mg		
10kg	0.18g		
20kg	0.46g		

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SCOPE OF CALIBRATION: MASS

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Weighing Instruments	Up to 200g	1mg	Calibrated using standard weight according to ASTM E898:88 (Reapproved 2013)
	Up to 500g	5mg	
	Up to 1kg	6mg	
	Up to 2kg	0.01g	
	Up to 5kg	0.05g	
	Up to 10kg	0.5g	
	Up to 20kg	0.7g	
	Up to 50kg	2g	
	Up to 100kg	3g	
	Up to 200kg	7g	
	Up to 300kg	14g	
	Up to 500kg	22g	
Up to 1000kg	50g		

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## SCOPE OF CALIBRATION: FORCE AND TORQUE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
<b>Force</b> Tension Measuring Device	0kgf to 20kgf 20kgf to 50kgf 50kgf to 100kgf	0.002kgf 0.02kgf 0.2kgf	Calibrated using poise weights
<b>Torque</b> Torque Measuring Device	0kgf.cm to 10kgf.cm 10kgf.cm to 100kgf.cm	0.016kgf.cm 0.13kgf.cm	Calibrated using poise weights as standards based on BS7882:2017
Torque Tools	0N.m to 1N.m 1N.m to 10N.m 10N.m to 50N.m 50N.m to 100N.m 100N.m to 300N.m	0.003N.m 0.03N.m 0.1N.m 0.2N.m 0.4N.m	Calibrated using Torque Tester based on ISO6789:2017

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## SCOPE OF CALIBRATION: PRESSURE

## SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
<b>PRESSURE</b>			
Pressure Measuring Device			Calibrated according to AS 1349:1986
Vacuum	-0.9bar to 0bar	0.03bar	
Pneumatic	0bar to 0.35bar 0.35bar to 6bar 6bar to 20bar	0.0012bar 0.004bar 0.03bar	
Hydraulic	0bar to 350bar	0.5 bar	

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## SCOPE OF CALIBRATION: TEMPERATURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Liquid in Glass Thermometer Total Immersion Partial Immersion	-20°C to 200°C -10 to 110°C	0.5°C 0.5°C	Comparison with PT100 as reference
Temperature Sensor Thermocouple	-20°C to 200°C 200°C to 400°C 400°C to 600°C 600°C to 800°C 800°C to 1000°C 1000°C to 1200°C	0.5°C 1.9°C 1.9°C 2.9°C 3.3°C 4.2°C	Comparison with standard thermocouple/PT100 as reference
PRT	-20°C to 200°C	0.5°C	Comparison with SPRT as reference
Temperature Indicating Device K-Type J-Type T-Type E-Type R-Type Pt100	-100°C to 1300°C -100°C to 1200°C -100°C to 400°C -100°C to 950°C 0°C to 1700°C -100°C to 800°C	1.0°C 0.8°C 1.0°C 0.6°C 2.0°C 0.4°C	Calibration by electrical simulation
Temperature Measuring Devices	-20°C to 60°C	0.7°C	Calibrated by comparison in Humidity Chamber
Thermohygro Measuring Device	15°C to 35°C 30 % RH to 95 % RH	0.7°C 5 % RH	Calibrated by comparison with standard thermohygrometer in humidity chamber based on BS1339:2004

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## Signatories:

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2. Mohd Yussairos bin Mohd Yusof



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**SCOPE OF CALIBRATION: TEMPERATURE****SITE: CATEGORY I**

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty( $\pm$ )*	Remarks
Heat Enclosure Temperature Controlled Enclosure	-50°C to -20°C -20°C to 200°C 200°C to 600°C 600°C to 800°C 800°C to 1000°C	1.0°C 1.1°C 1.6°C 3.0°C 3.4°C	Based on AS2853:1986
Temperature Indicating Device  K-Type J-Type T-Type E-Type R-Type Pt100	-100°C to 1300°C -100°C to 1200°C -100°C to 400°C -100°C to 950°C 0°C to 1700°C -100°C to 800°C	1.0°C 0.8°C 1.0°C 0.6°C 2.0°C 0.4°C	Calibration by electrical simulation
Temperature Sensor	-30 to 600°C 600°C to 1000°C 1000°C to 1200°C	0.5°C 2.0°C 3.0°C	Comparison with standard thermocouple/PT100 as reference

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2. Mohd Yussairos bin Mohd Yusof