S/N: 1530

STANDARDS MALAYSIA

Certificate of Accreditation

No: SAMM 325

Accredited since: 12 April 2006

This is to certify that

TRESCAL (MALAYSIA) SDN. BHD.
BUKIT MERTAJAM, PULAU PINANG
MALAYSIA

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for the current scope of accreditation

has been granted accreditation in respect of the scope of accreditation described in the schedule, subject to the terms and conditions governing the *Skim Akreditasi Makmal Malaysia* (SAMM), the Laboratory Accreditation Scheme of Malaysia.

Laboratories accredited under SAMM meet the requirements of MS ISO/IEC 17025. This Malaysian Standard is identical with ISO/IEC 17025 published by the International Organization for Standardization (ISO).

(SHAHARUL SADRI BIN ALWI)
Director General
Department of Standards Malaysia

Date of issue: 27 April 2020
(Issue 2, 27 April 2020 replacement of SAMM 325 dated 25 April 2018)

Issuance of this Certificate is governed by Section 16 Subsections (2) and (3) of Standards of Malaysia Act 1996 (Act 549)

Issue date: 27 April 2020
Valid until: 12 April 2021

MS ISO/IEC 17025

NO: SAMM 325
(Issue 3, 27 April 2020 replacement
of SAMM 325 dated 7 November 2019)

LABORATORY LOCATION:
(PERMANENT LABORATORY)

TRESCAL (MALAYSIA) SDN. BHD.
PMT 2927, JALAN MEGAT HARUN
PUSAT PERNIAGAAN MAJU
14000 BUKIT MERTAJAM
PULAU PINANG
MALAYSIA

FIELDS OF CALIBRATION: **TEMPERATURE, DIMENSIONAL, MASS, PRESSURE, FORCE, TORQUE, TIME & FREQUENCY**

This laboratory has demonstrated its technical competence to operate in accordance with MS ISO/IEC 17025:2017 (ISO/IEC 17025:2017).

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: TEMPERATURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Liquid-in-glass thermometer (total & partial immersion)	-30 °C to 0 °C 0 °C to 200 °C 200 °C to 400 °C	0.08 °C 0.07 °C 0.35 °C	Comparison with Pt 100 reference in: liquid bath and temperature block calibrator
Temperature sensor (Platinum resistance thermometer, thermocouple, thermistor)	-30 °C to 0 °C 0 °C to 250 °C 250 °C to 400 °C 400 °C to 600 °C 600 °C to 1000 °C 1000 °C to 1200 °C	0.08 °C 0.08 °C 0.36 °C 1.0 °C 2.1 °C 2.7 °C	Comparison with Pt 100/ Type R thermocouple reference in: liquid bath and temperature block calibrator
Temperature sensor with indicator (Platinum resistance thermometer, thermocouple, thermistor, temperature gauge)	-30 °C to 0 °C 0 °C to 250 °C 250 °C to 400 °C 400 °C to 600 °C 600 °C to 1000 °C 1000 °C to 1200 °C	0.08 °C 0.07 °C 0.36 °C 1.0 °C 2.2 °C 2.7 °C	

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SCOPE FIELD OF CALIBRATION: TEMPERATURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Temperature & Humidity Indicator or Recorder	10 °C to 50 °C 20 %rh to 50 %rh 50 %rh to 70 %rh 70 %rh to 90 %rh (at 25 °C)	0.09 °C 1.6 %rh 1.8 %rh 1.9 %rh	Comparison with Thermohygrometer / Pt 100
Temperature calibrator **I) Source**			By electrical measurement using multimeter & reference table ITS 90
a) Type K	-270 °C to -100 °C -100 °C to 1370 °C	1.0 °C 0.1 °C	
b) Type N	-260 °C to -100 °C -100 °C to 1300 °C	1.1 °C 0.1 °C	
c) Type J	-210 °C to 1200 °C	0.1 °C	
d) Type T	-270 °C to -100 °C -100 °C to 400 °C	0.6 °C 0.1 °C	
e) Type E	-270 °C to -100 °C -100 °C to 1000 °C	0.6 °C 0.1 °C	
f) Type R	-50 °C to 500 °C 500 °C to 1760 °C	0.3 °C 0.2 °C	
g) Type S	-50 °C to 500 °C 500 °C to 1760 °C	0.3 °C 0.2 °C	
h) Type B	100 °C to 500 °C 500 °C to 1800 °C	1.1 °C 0.3 °C	
i) Pt 100	-200 °C to 850 °C	0.1 °C	

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SCOPE OF CALIBRATION: TEMPERATURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
II) Measurement			
a) Type K	-270 °C to -100 °C -100 °C to 1370 °C	1.1 °C 0.2 °C	
b) Type N	-260 °C to -100 °C -100 °C to 1300 °C	1.1 °C 0.2 °C	
c) Type J	-210 °C to 1200 °C	0.2 °C	
d) Type T	-270 °C to -100 °C -100 °C to 400 °C	0.6 °C 0.2 °C	By electrical simulation using calibrator & reference table ITS 90
e) Type E	-270 °C to -100 °C -100 °C to 1000 °C	0.6 °C 0.2 °C	
f) Type R	0 °C to 1760 °C	2 °C	
g) Type S	0 °C to 1760 °C	2 °C	
h) Type B	600 °C to 1800 °C	2 °C	
i) Pt 100	-200 °C to 850 °C	0.2 °C	

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SCOPE OF CALIBRATION: TEMPERATURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Temperature indicating device (by electrical simulation)			
a) Type K	-270 °C to -100 °C -100 °C to 1370 °C	1.1 °C 0.2 °C	
b) Type N	-200 °C to -100 °C -100 °C to 1300 °C	1.1 °C 0.2 °C	
c) Type J	-210 °C to 1200 °C	0.2 °C	
d) Type T	-270 °C to -100 °C -100 °C to 400 °C	0.6 °C 0.2 °C	By electrical simulation using calibrator & reference table ITS 90
e) Type E	-250 °C to -100 °C -100 °C to 1000 °C	0.6 °C 0.2 °C	
f) Type R	0 °C to 1760 °C	2 °C	
g) Type S	0 °C to 1760 °C	2 °C	
h) Type B	600 °C to 1800 °C	2 °C	
i) Pt 100	-200 °C to 850 °C	0.2 °C	

Signatories:

1. **Hasnas binti Hussain**
2. **** Oh Joo Kiat**
3. **** Teo Hun Wei**

** Non-resident signatory

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SCOPE OF CALIBRATION: TEMPERATURE

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Temperature sensor (Platinum resistance thermometer, thermocouple, thermistor)	0 °C to 200 °C 200 °C to 400 °C	0.2 °C 0.4 °C	Comparison with Pt 100 reference in: liquid bath and temperature block calibrator
Temperature sensor with indicator (Platinum resistance thermometer, thermocouple, thermistor, temperature gauge)	0 °C to 200 °C 200 °C to 400 °C	0.08 °C 0.33 °C	
Temperature indicating device (by electrical simulation)			By electrical simulation using calibrator & reference table ITS 90
a) Type K	-270 °C to -100 °C -100 °C to 1370 °C	1.1 °C 0.2 °C	
b) Type N	-200 °C to -100 °C -100 °C to 1300 °C	1.1 °C 0.2 °C	
c) Type J	-210 °C to 1200 °C	0.2 °C	
d) Type T	-270 °C to -100 °C -100 °C to 400 °C	0.6 °C 0.2 °C	
e) Type E	-250 °C to -100 °C -100 °C to 1000 °C	0.6 °C 0.2 °C	
f) Type R	0 °C to 1760 °C	2 °C	
g) Type S	0 °C to 1760 °C	2 °C	
h) Type B	600 °C to 1800 °C	2 °C	
i) Pt 100	-200 °C to 850 °C	0.2 °C	
Temperature controlled enclosure	-80 °C to -30 °C -30 °C to 100 °C 100 °C to 250 °C 250 °C to 600 °C 600 °C to 1300 °C	0.7 °C 0.2 °C 0.6 °C 1.7 °C 2.7 °C	Calibrate by using temperature recorder with Pt 100 / thermocouple based on AS 2853-1986

SCOPE OF CALIBRATION: TEMPERATURE

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Humidity enclosure	5 °C to 60 °C 20 %rh to 95 %rh	0.2 °C 2.4 %rh	Calibrated by using Pt 100 / thermohygrometer based on AS 2853-1986

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SCOPE OF CALIBRATION: DIMENSIONAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Precision caliper (internal & external)	Up to 200 mm 200 mm to 400 mm 400 mm to 600 mm	0.006 mm 0.007 mm 0.008 mm	Calibrated by using caliper checker / gauge block with reference to JIS B7507:2016
Micrometer (external)	Up to 25 mm 25 mm to 150 mm	0.002 mm 0.003 mm	Calibrated by using gauge block and optical parallel with reference to JIS B7502:2016
Height gauge	Up to 300 mm 300 mm to 600 mm	0.007 mm 0.008 mm	Calibrated by using caliper checker & dial test indicator and standard square with reference to JIS B 7517:1993
Dial thickness gauge	Up to 20 mm	1 µm	Calibrated by using gauge block with reference to JIS B 7503:2011
Dial gauge	Up to 25 mm 25 mm to 50 mm	1.0 µm 1.7 µm	Calibrated by using dial gauge tester and micrometer head with reference to JIS B 7503:2011
Dial test indicator	Up to 0.28 mm 0.28 mm to 0.6 mm 0.6 mm to 1.5 mm	1.5 µm 1.8 µm 5.0 µm	Calibrated by using gauge block and dial gauge tester with reference to JIS B 7533:2015
Digital indicator	Up to 50 mm	2.0 µm	Calibrated by using gauge block with reference to JIS B 7503:2011
Feeler Gauge	0.01 mm to 1 mm	2.2 µm	Calibrated by using Digital Micrometer with reference to BS 957:2008

SCOPE OF CALIBRATION: DIMENSIONAL

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
External Parallel Screw Thread Plug Gauge (Simple Pitch Diameter and Major Diameter)	2 mm to 24 mm	Major Diameter: 2.0 µm Simple Pitch Diameter: 3.0 µm	Calibrated by using 3 wire pin set scale and Micrometer with reference to JIS B 0261:2004

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SCOPE OF CALIBRATION: DIMENSIONAL

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Surface Plate	300 mm x 300 mm 600 mm x 600 mm 1000 mm x 1000 mm 1600 mm x 2500 mm	1.0 µm 1.9 µm 2.1 µm 3.4 µm	Calibrated by using precision inclinometer with reference to BS 817:2008
Toolmaker's Microscope (Independent Linear Scale Only)	Up to 140 mm	1.5 µm	Calibrated by using glass scale with reference to JIS B 7184:1999
Profile projector (Independent linear scale only)	Up to 140 mm	1.5 µm	Calibrated by using glass scale with reference to JIS B7184:1999

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SCOPE OF CALIBRATION: MASS

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Standard Weight	2 kg to 25 kg	0.2 g	Calibrated using standard weight and comparator as standard according to OIML R111-1:2004 (E)

SCOPE OF CALIBRATION: MASS

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Balance and Weighing Scale	Up to 200 g Up to 1000 g Up to 5 kg Up to 10 kg Up to 20 kg Up to 50 kg Up to 100 kg Up to 500 kg Up to 1000 kg	0.5 mg 3 mg 0.02 g 0.03 g 0.1 g 6 g 10 g 90 g 120 g	Calibrated using standard weights with general reference to ASTM E 898-88 (2013) and LAB 14 Edition 2006

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SCOPE OF CALIBRATION: PRESSURE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Pressure Measuring Device			
Vacuum	Up to –0.95 bar	0.002 bar	
Pneumatic	0 mbar to 70 mbar 70 mbar to 700 mbar 0 bar (abs) to 7 bar (abs) 0.7 bar to 6 bar 6 bar to 30 bar	0.016 mbar 0.14 mbar 0.0011 bar (abs) 0.004 bar 0.008 bar	Calibrated using test gauge as standard according to AS 1349 (1986) and DKD-R-6-1 (edition 01/2003)
Hydraulic	0 bar to 350 bar 350 bar to 700 bar	0.09 bar 0.16 bar	

SCOPE OF CALIBRATION: PRESSURE

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Pressure Measuring Device			
Vacuum	Up to -0.95 bar	0.002 bar	
Pneumatic	0 mbar to 70 mbar 70 mbar to 700 mbar 0 bar (abs) to 7 bar (abs) 0.7 bar to 6 bar 6 bar to 30 bar	0.016 mbar 0.14 mbar 0.0011 bar (abs) 0.004 bar 0.008 bar	Calibrated using test gauge as standard according to AS 1349 (1986) and DKD-R-6-1 (edition 01/2003)
Hydraulic	0 bar to 350 bar 350 bar to 700 bar	0.09 bar 0.16 bar	

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SCOPE OF CALIBRATION: FORCE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Force measuring device	0 N to 4.9 N 4.9 N to 980 N	0.001 N 0.03 N	Calibrated by using dead weight with reference to ISO 376:2011

SCOPE OF CALIBRATION: FORCE

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Compression / tensile testing machine	Up to 100 kgf 100 kgf to 1000 kgf 1000 kgf to 5000 kgf 5000 kgf to 10000 kgf	0.006 kgf 0.8 kgf 3 kgf 8 kgf	Calibrated by using load cell based on ISO 7500-1:2004

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SCOPE OF CALIBRATION: TORQUE

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Hand Torque Tools	0 N.m to 2 N.m 2 N.m to 10 N.m 10 N.m to 25 N.m 25 N.m to 150 N.m 150 N.m to 400 N.m 400 N.m to 1000 N.m	0.85 % of rdg. 0.34 % of rdg. 0.35 % of rdg. 0.40 % of rdg. 0.25 % of rdg. 0.23 % of rdg.	Calibrated by using torque calibrator based on ISO 6789:2017

Signatories:

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2. **** Oh Joo Kiat**
3. **** Teo Hun Wei**

** Non-resident signatory

SCOPE OF CALIBRATION: TIME & FREQUENCY

SITE: CATEGORY I

Instrument Calibrated/ Measurement Parameter	Range	Calibration and Measurement Capability Expressed as an Uncertainty (±)*	Remarks
Stop watch / Timer	0 s to 300 s 300 s to 3600 s 3600 s to 10800 s	0.19 s 0.60 s 1.8 s	Calibrate by using comparison method according to NIST stop watch and timer calibration
RPM Meter Contact Non-contact	Up to 5000 rpm 60 rpm to 20000 rpm	1.0 rpm 1.0 rpm	Calibrated using tachometer

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