Scope of Accreditation for Calibration

Certificate No. 20C110/0789

Laboratory Name Central Laboratory (Thailand) Company Limited
Address 50 Phaholyothin Road, Ladyao, Jatujak, Bangkok
Accreditation no. CALIBRATION 0125
Laboratory Status ☑ Permanent ☐ Site ☐ Temporary ☐ Mobile

Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
1. Temperature	Liquid in glass thermometer		In-house method :
	Total immersion		WI-TMP-105-CC
	-40 °C to 250 °C	0.044°C	based on ASTM E 77
	Temperature indicator/logger with sensor		In-house method :
	Resistance thermometer		WI-TMP-114-CC
	-40 °C to 250 °C	0.034°C	by comparison technique
	Thermocouple		
	Type E, J, K, T and N		
	-40 °C to 50 °C	0.14 °C	
	> 50 °C to 100 °C	0.25 °C	
	> 100 °C to 150 °C	0.36 °C	
	> 150 °C to 200 °C	0.47 °C	
	> 200 °C to 250 °C	0.59 °C	
	> 250 °C to 300 °C	1.5 °C	
	> 300 °C to 400 °C	1.8 °C	
	> 400 °C to 600 °C	2.3 °C	
	Type S and R		
	200 °C to 650 °C	1.7 °C	
	Dial thermometer		In-house method :
	-40 °C to 250 °C	0.59 °C	WI-TMP-111-CC
			by comparison technique

* Expressed as an uncertainty (±) providing a level of confidence of approximately 95 %

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
1. Temperature (cont.)	Temperature graph recorder with sensor		In-house method : WI-TMP-114-CC
	Resistance thermometer		by comparison technique
	0 °C to 150 °C	0.60 °C	
	PRT and IPRT 4 wire sensor		In-house method :
	-40 °C to 250 °C	0.025 °C	WI-TMP-116-CC based on ASTM E 644-04, BS EN 60751 : 1996 and IEC 751 : 1983
	Thermocouple sensor		In-house method :
	Type J, K and T		WI-TMP-117-CC based on
	0 °C to 100 °C	0.40 °C	ASTM E 220/E 230
	> 100 °C to 200 °C	0.75 °C	
	Thermo-hygrometer, Temperature & humidity data logger		In-house method : WI-HUM-001-CC by comparison with temperature humidity meter in controlled chamber
	Temperature		
	10 °C to 60 °C	0.42 °C	
	Relative humidity		
	@ 25 °C		
	15 % to 30 %	2.4 %	
	> 30 % to 70 %	2.2 %	
	> 70 % to 90 %	2.4 %	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
2. Chemical	Burette		In-house method : WI-VOL-101-CC based on ASTM E 542-2001
	2.5 cm^3	0.003 6 cm^3	
	> 2.5 cm^3 to 10 cm^3	0.003 8 cm^3	
	> 10 cm^3 to 25 cm^3	0.006 7 cm^3	
	> 25 cm^3 to 50 cm^3	0.011 cm^3	
	> 50 cm^3 to 100 cm^3	0.022 cm^3	
	Volumetric flask		
	5 cm^3	0.005 9 cm^3	
	10 cm^3	0.006 0 cm^3	
	20 cm^3	0.006 4 cm^3	
	25 cm^3	0.006 6 cm^3	
	50 cm^3	0.010 cm^3	
	100 cm^3	0.018 cm^3	
	200 cm^3	0.029 cm^3	
	250 cm^3	0.036 cm^3	
	500 cm^3	0.064 cm^3	
	1 000 cm^3	0.13 cm^3	
	2 000 cm^3	0.26 cm^3	
	Volumetric pipette		
	0.5 cm^3	0.002 4 cm^3	
	1 cm^3	0.002 4 cm^3	
	2 cm^3	0.002 4 cm^3	
	3 cm^3	0.002 5 cm^3	
	4 cm^3	0.002 5 cm^3	
	5 cm^3	0.002 5 cm^3	
	10 cm^3	0.004 5 cm^3	
	15 cm^3	0.006 4 cm^3	
	20 cm^3	0.006 5 cm^3	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
2. Chemical (cont.)	Volumetric pipette (cont.)		In-house method :
	25 cm^3	0.007 3 cm^3	WI-VOL-101-CC based on
	50 cm^3	0.012 cm^3	ASTM E 542-2001
	100 cm^3	0.018 cm^3	
	Graduated pipette		
	0.5 cm^3	0.002 4 cm^3	
	> 0.5 cm^3 to 1 cm^3	0.002 4 cm^3	
	> 1 cm^3 to 5 cm^3	0.002 5 cm^3	
	> 5 cm^3 to 10 cm^3	0.004 3 cm^3	
	> 10 cm^3 to 25 cm^3	0.009 9 cm^3	
	Piston pipette		In-house method :
	> 10 µl to 50 µl	0.069 µl	WI-VOL-102-CC based on
	> 50 µl to 100 µl	0.19 µl	ISO 8655 : 2002
	> 100 µl to 500 µl	0.23 µl	
	> 500 µl to 1 000 µl	0.30 µl	
	> 1 000 µl to 2 500 µl	1.3 µl	
	> 2 500 µl to 5 000 µl	1.4 µl	
	> 5 000 µl to 10 000 µl	1.8 µl	
	Cylinder		In-house method :
	5 cm^3	0.009 6 cm^3	WI-VOL-101-CC based on
	> 5 cm^3 to 10 cm^3	0.009 7 cm^3	ASTM E 542-2001
	> 10 cm^3 to 25 cm^3	0.016 cm^3	
	> 25 cm^3 to 50 cm^3	0.020 cm^3	
	> 50 cm^3 to 100 cm^3	0.026 cm^3	
	> 100 cm^3 to 250 cm^3	0.049 cm^3	
	> 250 cm^3 to 500 cm^3	0.079 cm^3	
	> 500 cm^3 to 1 000 cm^3	0.14 cm^3	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
3. Mass	Conventional mass Class F1		OIML R 111-1
	1 g	0.019 mg	
	2 g	0.022 mg	
	5 g	0.027 mg	
	10 g	0.033 mg	
	20 g	0.040 mg	
	50 g	0.048 mg	
	100 g	0.078 mg	
	200 g	0.16 mg	
	500 g	0.40 mg	
	1 kg	1.3 mg	
	2 kg	1.9 mg	
	5 kg	4.0 mg	
	Class M1		
	0.1 g	0.013 mg	
	0.2 g	0.015 mg	
	0.5 g	0.019 mg	
	10 kg	0.092 g	
	20 kg	0.11 g	
	Conventional mass		
	0.01 g	0.011 mg	
	0.02 g	0.012 mg	
	0.05 g	0.012 mg	
	0.1 g	0.013 mg	
	0.2 g	0.014 mg	
	0.5 g	0.016 mg	
	1 g	0.019 mg	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
3. Mass (cont.)	Conventional mass (cont.)		OIML R 111-1
	2 g	0.022 mg	
	5 g	0.027 mg	
	10 g	0.033 mg	
	20 g	0.040 mg	
	50 g	0.048 mg	
	100 g	0.078 mg	
	200 g	0.16 mg	
	500 g	0.40 mg	
	1 kg	1.3 mg	
	2 kg	1.9 mg	
	5 kg	4.0 mg	
	10 kg	0.11 g	
	20 kg	0.12 g	
4. Dimension	Micrometer caliper for external measurement		In-house method : WI-DMS-101-CC based on JIS B 7502 : 1994
	0 mm to 15 mm	0.95 µm	
	> 15 mm to 25 mm	1.1 µm	
	Vernier, dial and digital caliper		In-house method : WI-DMS-102-CC based on JIS B 7507 : 1993
	0 mm to 300 mm	16 µm	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
1. Temperature	Temperature indicator/logger with sensor		In-house method : WI-TMP-114-CC by comparison technique
	Resistance thermometer		
	-30 °C to 125 °C	0.13 °C	
	> 125 °C to 300 °C	1.5 °C	
	Thermocouple		
	Type E, J, K, T and N		
	-30 °C to 50 °C	0.17 °C	
	> 50 °C to 100 °C	0.26 °C	
	> 100 °C to 125 °C	0.37 °C	
	> 125 °C to 200 °C	0.52 °C	
	> 200 °C to 250 °C	0.60 °C	
	> 250 °C to 300 °C	0.71 °C	
	Temperature graph recorder with sensor		In-house method : WI-TMP-114-CC by comparison technique
	Resistance thermometer		
	0 °C to 150 °C	0.60 °C	
	Dial thermometer		In-house method : WI-TMP-111-CC by comparison technique
	-30 °C to 125 °C	0.59 °C	
	Liquid bath		In-house method : WI-TMP-001-CC based on ASTM E 715-80 : 2001
	0 °C to 50 °C	0.13 °C	
	> 50 °C to 100 °C	0.17 °C	
	Autoclave		In-house method : WI-TMP-003-CC based on BS 2646-5 : 1993
	110 °C to 125 °C	0.76 °C	

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1. Temperature (cont.)	Temperature controlled chamber		In-house method : WI-TMP-002-CC based on ASTM E 145-94 : 2001
	-40 °C to 0 °C	1.1 °C	
	> 0 °C to 70 °C	0.47 °C	
	> 70 °C to 150 °C	0.79 °C	
	> 150 °C to 200 °C	1.3 °C	
	Furnace		In-house method : WI-TMP-004-CC by comparison technique
	200 °C to 650 °C	2.7 °C	
2. Mass	Electronic balance		In-house method : WI-MAS-002-CC based on UKAS LAB 14 : 2015
	1 mg to 10 mg	9.4µg	
	> 10 mg to 50 mg	10 µg	
	> 50 mg to 100 mg	11µg	
	> 100 mg to 500 mg	12 µg	
	> 500 mg to 1 000 mg	14 µg	
	> 1 g to 5 g	21 µg	
	> 5 g to 10 g	26 µg	
	> 10 g to 20 g	37 µg	
	> 20 g to 40 g	73 µg	
	> 40 g to 60 g	88 µg	
	> 60 g to 80 g	0.13 mg	
	> 80 g to 100 g	0.14 mg	
	> 100 g to 120 g	0.17 mg	
	> 120 g to 140 g	0.21 mg	
	> 140 g to 160 g	0.23 mg	
	> 160 g to 200 g	0.26 mg	
	> 200 g to 300 g	0.41 mg	

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
2. Mass (cont.)	Electronic balance (cont.)		In-house method :
	> 300 g to 500 g	0.66 mg	WI-MAS-002-CC based on
	> 500 g to 1 000 g	1.6 mg	UKAS LAB 14 : 2015
	> 1 000 g to 1 500 g	2.2 mg	
	> 1 500 g to 2 000 g	2.8 mg	
	> 2 000 g to 2 500 g	3.4 mg	
	> 2 500 g to 3 000 g	3.9 mg	
	> 3 000 g to 4 000 g	6.5 mg	
	> 4 000 g to 5 000 g	7.0 mg	
	> 5 kg to 10 kg	0.085 g	
	> 10 kg to 20 kg	0.091 g	
	> 20 kg to 30 kg	0.20 g	
	> 30 kg to 60 kg	0.84 g	
	> 60 kg to 120 kg	8.4 g	
	> 120 kg to 150 kg	8.6 g	
3. Electrical	Centrifuge		In-house method :
	Shaker or rotator		WI-SPD-001-CC
	50 r/min to < 1 000 r/min	0.61 r/min	by direct measurement
	1 000 r/min to 15 000 r/min	1.5 r/min	with digital tachometer
4. Chemical	Breath alcohol tester		In-house method :
	45 mg/100 ml to		WI-CHM-002-CC
	55 mg/100 ml	2.2 mg/100 ml	by wet bath simulator technique

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Field of Calibration	Parameter	Calibration and Measurement Capability*	Method Used
4. Chemical (cont.)	pH meter		In-house method : WI-CHM-001-CC based on ASTM E 70-07
	DC Voltage		
	-177.48 mV	0.068 mV	
	-128.97 mV	0.068 mV	
	0 mV	0.068 mV	
	8.28 mV	0.068 mV	
	177.48 mV	0.068 mV	
	314.73 mV	0.068 mV	
	Nominal pH		
	1.7	0.007 8	
	4	0.007 8	
	7	0.007 8	
	9	0.007 8	
	10	0.007 8	

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(Signature)

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Deputy Secretary-General

for Secretary-General, Thai Industrial Standards Institute