

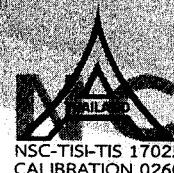


CRYSTAL CALIBRATION SALES AND SERVICE CO., LTD.

45/48 Soi Salathammasop31, Salathammasop Rd.,

Salathammasop, Thawewatthana, Bangkok 10170 Thailand

Tel : 0-2408-8474-5 Fax : 0-2408-8477 Email : info@crystalcal.com www.crystalcal.com



CERTIFICATE OF CALIBRATION

Certificate No. : 25-1390-037

Issue Date : 24 October 2025

Work Order No. : 25/1390

Customer Name : กลุ่มงานเทคนิคการแพทย์ โรงพยาบาลพระจอมเกล้า จังหวัดเพชรบุรี
53 ถนนไฟ ต.คลองกระแซง
อ.เมือง จ.เพชรบุรี 76000

Date of Received : 20 October 2025

Date of Calibration : 24 October 2025

Instrument Details : Description : Piston pipette (Auto pipette)
Manufacturer : NICHIRYO
Model : Nichipet EX
Serial No. : H65026342
ID No. : 6515-038-5004-2/52
Volume range : 100 µl to 1000 µl
Type : Variable volume single channel (air displacement)
Location : Mass and Volumetric Calibration Laboratory

Calibration Method : This instrument was calibrated by Gravimetric methods for the determination of measurement error according to calibration procedure no. CWI-V-01 based on ISO 8655 : 2002 Part 2, 6

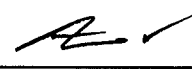
Environmental Condition

Ambient Temperature : Control at 20 °C ± 2.5 °C
Relative humidity : Control at 50 %RH ± 10 %RH
Atmospheric pressure : Monitoring at 1010 hPa ± 10 hPa

Traceability of Measurement

: This certificate of calibration documents the traceability to national standard, which realize the unit of measurement according to the International system of Units (SI)

Calibrated by : Miss Lalitphat Thiankaew
Calibration Engineer

Approved by : 
(Mr. Anuwat Yaklermjit)
Laboratory Manager

This certificate may not be reproduced other than in full except with the prior written approval of Crystal Calibration Sales and Service co., Ltd.

Crystal Calibration Sales and Service Co., Ltd.

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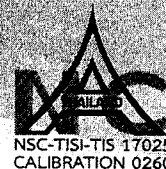


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**CERTIFICATE OF CALIBRATION**

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Work Order No. : 25/1390

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Details of Calibration**1. Reference Standards Instrument**

Instrument	Serial No. / ID No.	Certification	Due Date
1.1 Electronic Balance	BAL-11	25-0164-008	14 March 2026
1.2 Digital Thermometer with sensor	RTD-09	25-0164-009	3 March 2026
1.3 Thermo hygrometer	TH-07	25-01644-016	28 February 2026
1.4 Barometer	BM-06	L202509118-0001	9 September 2026

2. Certificate traceable : This certificate traceable to The International System of Unit refer to

1.1 Crystal Calibration Sales and Service Co., Ltd., NSC-ONSC Calibration No. 0260

1.2 to 1.3 Crystal Calibration Sales and Service Co., Ltd., NSC-ONSC Calibration No. 0260

1.4 Miracle international Technology Co., Ltd., NSC-ONSC Calibration No. 0052

3. Condition of item : Used**4. Calibration site** : Permanent**Result of Calibration**

This result of calibration : Without Adjustment

Resolution : 1.0 μ l

Test volume	(μ l)	100	500	1000
Setting volume	(μ l)	100	500	1000
Mean volume	(μ l)	102.4218	503.6229	1007.1701
Uncertainty of measurement	($\pm \mu$ l)	0.064	0.14	0.30
Coverage factor (k)		2.09	2.15	2.23
Systematic : Error (e_s)	(μ l)	2.4218	3.6229	7.1701
: Error in percent (% e_s)		0.242	0.362	0.717
Random : Error (S_r)	(μ l)	0.053	0.107	0.267
: Error in percent (%CV)		0.052	0.021	0.026

Note :

- Nominal volume piston pipette : 1000 μ l
- The result of repeat the test 10 measurements
- The Calibration process calcurate temperature reference is 20°C
- The values obtained are the mass values of the volume delivered (Ex.)
- Pipette tip : Manufacturer: eppendorf ; Color code: Colorless ; Capacity: 50 ul to 1000 ul ; Length : 70 mm ; None filter
- The standard uncertainty of measurement has been determined in accordance with ISO/TR 20461:2000
- Calibrate items it good condition this report customer request and accepted in certificate

This result of calibration was found accurate as shown on date and place of calibration only.

The reported uncertainty of measurement was based on a standard uncertainty multiplied by a coverage factor $k=2$ providing a level of confidence of approximately 95%.

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Statements of conformity report

Certificate No. : 25-1390-037

Issue Date : 24 October 2025

Work Order No. : 25/1390

Detail of Equipment :

Description : Piston pipette (Auto pipette)

Manufacturer : NICHIRYO

ID No. : 6515-038-5004-2/52

Model : Nichipet EX

Volume range : 100 μ l to 1000 μ l

Serial No. : H65026342

Result of Calibration :

This result of calibration : Without Adjustment

Resolution : 1.0 μ l

Test volume	(μ l)	100	500	1000	
Setting volume	(μ l)	100	500	1000	
Mean volume	(μ l)	102.4218	503.6229	1007.1701	
Uncertainty of measurement	($\pm$ μ l)	0.064	0.14	0.30	
Coverage factor (k)		2.09	2.15	2.23	
Systematic : Error (e_s)	(μ l)	2.4218	3.6229	7.1701	
: Error in percent (% e_s)		2.422	0.725	0.717	
Random : Error (S_r)	(μ l)	0.053	0.107	0.267	
: Error in percent (%CV)		0.053	0.021	0.027	
Evaluate report (Systematic)	: Abs. Error+Uncertainty	(μ l)	2.4858	3.7629	7.4701
	: MPE. Error (e_s)	(μ l)	8	8	8
	: Result (PASS / FAIL)		PASS	PASS	PASS
	: Abs. Error+Uncertainty in percent		2.4843	0.7524	0.7468
	: MPE. Error in percent (% e_s)		8.00	1.60	0.80
	: Result (PASS / FAIL)		PASS	PASS	PASS
Evaluate report (Random)	: MPE Error (S_r)	(μ l)	3	3	3
	: Result (PASS / FAIL)		PASS	PASS	PASS
	: MPE Error in percent (CV)		3	0.6	0.3
	: Result (PASS / FAIL)		PASS	PASS	PASS

This statement judgment and decision by Laboratory guideline only

The conformity certificate documents validity following ISO/IEC Guide 98-4 : Role of measurement uncertainty in conformity assessment based on statement with guard band refer to ISO 8655 : 2022 consider expanded measurement uncertainty (k=95%)

The tolerance and decision rules ;MPE of Systematic error = Measurement uncertainty + Absolute error ; $\leq$ MPE is pass , $>$ MPE is FailMPE of Random error = Random error comparative with ISO 8655 : 2022 in table 1 ; $\leq$ MPE is pass , $>$ MPE is Fail

Statements of conformity decision by :

(Mr. Anuwat Yaklermjit)

Laboratory Manager

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