Calibration Certificate No.
TW0436-005-042219-TTR

METTLER TOLEDO

Calibration Certificate for METTLER TOLEDO Titrators Titration Excellence T5/T7/T9

Customer

Company:	瑞士商梅特勒-托利多股份有限公司台灣分公司		
Address:	內湖區舊宗路二段171巷17號2樓		
Cust. ID No.:	97171937	**City:**	台北市
Zip/Postal:	114	**State/Province:**	

Device

Certified Titrator: T5

Serial No.:	B843648866	**Firmware Ver.:**	5.3.0
Main Board Chip ID:	N/A	**MB Firmware Ver.:**	1.2
		Asset Number:	

Procedure

The titrator listed in this document has been calibrated and certified according to the METTLER TOLEDO certification guideline ME-30308358. The certification guideline document is METTLER TOLEDO's internal document, intended for exclusive use by METTLER TOLEDO's service specialist.

The measurements were carried out under ambient conditions and the results on the following pages of this certificate were obtained at conditions prevailing at the time of calibration.

Building	
Floor	
Room	
Date:	22-04-2019
Next Certificate Date:	21-04-2020

Service Technician: Kimi Chen

瑞士商梅特勒托利多(股)台灣分公司 校正專用

Acceptance Summary

Overall Result: ✓ Passed

Type	Slot	Chip ID	FW Ver.	As Found	As Left
Analog Board	1	N/A	1.3	✓	N/A
Internal Burette Drive		NA	1.3	✓	N/A

Analog Board - As Found

Chip ID: N/A

pH Sensor Input - As Found

Impedance Table

Voltage	Measured Value [mV]	
500 mV	Sensor Input 1 [TΩ]	Sensor Input 2 [TΩ]
Voltage measured w/o resistor [mV]	500.42	500.49
Voltage measured w/250 MΩ resistor [mV]	500.38	500.45
Δ voltage [mV]	-0.04	-0.04
Max. permissible error [mV]	0.5	0.5
Result	✓	✓

Sensor Input 1

Nominal Value [mV]	Sensor Input 1			Result
	DVM Value [mV]	Sensor Value [mV]	MPE [mV]	
-1900.00	-1899.40	-1899.34	0.2	✓
-1000.00	-999.80	-999.74	0.2	✓
0.00	0.00	0.00	0.2	✓
1000.00	999.80	999.74	0.2	✓
1900.00	1899.40	1899.40	0.2	✓

Sensor Input 2

Nominal Value [mV]	Sensor Input 2			Result
	DVM Value [mV]	Sensor Value [mV]	MPE [mV]	
-1900.00	-1899.40	-1899.36	0.2	✓
-1000.00	-999.80	-999.76	0.2	✓
0.00	0.00	0.03	0.2	✓
1000.00	999.80	999.75	0.2	✓
1900.00	1899.40	1899.42	0.2	✓

Polarized Voltametric Sensor - As Found

Current Source

Certified Value of Resistor [Ω]	Measured at Target Current [µA]	Positive Voltage Value* [mV]	Negative Voltage Value* [mV]	Measured Current [µA]	Target Current [µA]	MPE [µA]	Result
9999.62	10.00	100.36	-100.53	10.04	10.00	1.00	✓
	20.00	199.85	-199.99	19.99	20.00	1.00	✓

Sensor Input

Measured at Target	Average Voltage [mV]	Voltage Sensor Input [mV]	Difference Found [mV]	MPE [mV]	Result
10.00	100.45	100.40	0.04	2.00	✓
20.00	199.92	199.90	0.02	2.00	✓

* Reading from the DVM

Polarized Amperometric Sensor - As Found

Voltage Source

Certified Value of Resistor [Ω]	Measured at Target Voltage [mV]	Positive Voltage	Negative Voltage	Average Voltage [mV]	MPE [mV]	Result
9999.62	1000.00	1006.40	-1006.10	1006.25	10.00	✓
	2000.00	2002.00	-2001.40	2001.70	10.00	✓

Sensor Input

Measured at Target Voltage [mV]	Average Current [µA]	Current Sensor Input [µA]	Difference Found [µA]	MPE [µA]	Result
1000.00	100.63	100.74	-0.11	0.2	✓
2000.00	200.18	200.28	-0.10	0.2	✓

* Reading from the DVM

Temperature Sensor Input Pt1000 - As Found

Pt1000 [°C]	Measured Value [°C]	Difference [°C]	MPE [°C]	Result
0	-0.13	0.13	0.2	✓
130	129.90	0.10	0.2	✓

Stroke of Burette Drive As Found

Serial Number: B843648866

Measured Values at 10% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	0	5000	5000	5000	0
2	0	5000	5000	5000	0
3	0	5000	5000	5000	0
x̄	0.00	5000.00	5000.00	5000	0.00

Measured Values at 30% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	0	14998	14998	15000	-2
2	0	14997	14997	15000	-3
3	0	14997	14997	15000	-3
x̄	0.00	14997.33	14997.33	15000	-2.67

Measured Values at 50% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	0	24994	24994	25000	-6
2	0	24994	24994	25000	-6
3	0	24993	24993	25000	-7
x̄	0.00	24993.67	24993.67	25000	-6.33

Measured Values at 100% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	0	49984	49984	50000	-16
2	0	49986	49986	50000	-14
3	0	49986	49986	50000	-14
x̄	0.00	49985.33	49985.33	50000	-14.67

These values are transferred to "Summary of the burette stroke measurements." In the summary, deviation values are shown as absolute values and two digits are added to the computed mean value to reduce rounding errors.

Summary of Burette Stroke Drive Measurements As Found

Burette Drive	10%	30%	50%	100%
Set Stroke [µM]	5000	15000	25000	50000
Actual Stroke [µM]	5000.00	14997.33	24993.67	49985.33
Absolute Deviation [µM]	0.00	2.67	6.33	14.67
Volume error calculated for 10mL burette [µL]	0.00	0.53	1.27	2.93
Max. Permissible Error [µM]	15	15	25	50
Result	✓	✓	✓	✓

Test Equipment

KF Resistor Unit

Serial No:	TC02A0013	Certificate No:	47175
Supplier	Mettler Toledo	Last Certification Date:	17-10-2018

Micrometer

Serial No:	7Z 006 00	Certificate No:	162196
Model Type:	DIAL GAUGE	Last Certification Date:	11-10-2018
Supplier	TESA		

mV Sensor Resistor

Serial No:	TC01A0030	Certificate No:	47173
Supplier	Mettler Toledo	Last Certification Date:	16-10-2018

Temperature Resistors PT100 & PT1000

Serial No:	A4098	Certificate No:	47174
Supplier	Mettler Toledo	Last Certification Date:	16-10-2018

Remarks

N/A