TEC INSTRUMENTAL S.A.

Blas Parera 1007, Florida B1602CTS Buenos Aires

Argentina

METTLER TOLEDO

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

Customer

Company:	Tec Instrumental SA				
Address:	Blas parera 1007, NA				
City:	Florida	Zip/Postal:	1602		
State/Province:	BSAS	Cust. ID No.:	TEC INSTRUMENTAL		
Ce					
Certilled Titrator. 15					
Serial No.:	B733542923	Firmware Ver.:	5.4.0		
Serial No.: Main Board Chip ID:	B733542923 01814D0F1A00005F	Firmware Ver.: MB Firmware Ver.:	5.4.0 1.2		

Procedure

The equipment detailed in this document has been calibrated and certified according to the METTLER TOLEDO certification guideline. The certification guideline document is METTLER TOLEDO's internal document, intended for exclusive use by METTLER TOLEDO service specialists.

The measurements were carried out under ambient conditions and the results on the following pages of this certificate were obtained under the conditions prevailing at the time of the calibration. The values in this certificate are reported in SI units and traceable to a National or International Metrology Institute.

Building:	Blas Parera	$ \wedge$
Floor:		
Room:		Service Technician:
Date:	30-12-2024	Pablo Dell'Oro
Next Certificate Date:	31-12-2025	

Acceptance Summary

Overall Result:

Passed

Туре	Slot	Chip ID	FW Ver.	As Found	As Left
Coulometer Board	4 011016261900003B		2.1	 Image: A set of the set of the	N/A
Internal Burette Drive		01B0530F1A00005B	1.3	 Image: A set of the set of the	N/A

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Coulometer Board - As Found

Chip ID

011016261900003B

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] 499.78 499.82 Voltage measured w/250 M Ω resistor [mV] 499.36 499.56 -0.26 Δ voltage [mV] -0.42 Max. permissible error [mV] 0.5 0.5 Result \checkmark \checkmark

Sensor Input 1

Nominal Value	Sensor Input 1				
[mV]	DVM Value [mV]	Sensor Value [mV]	MPE [mV]		
-1900.00	-1900.43	-1900.30	0.2	\checkmark	
-1000.00	-999.39	-999.30	0.2	~	
0.00	0.00	-0.05	0.2	 Image: A start of the start of	
1000.00	999.26	999.40	0.2	 Image: A second s	
1900.00	1900.24	1900.43	0.2	 	

Sensor Input 2

Nominal Value	Sensor Input 2				
[mV]	DVM Value [mV]	Sensor Value [mV]	MPE [mV]		
-1900.00	-1900.86	-1900.68	0.2	\checkmark	
-1000.00	-999.40	-999.21	0.2	~	
0.00	0.00	-0.07	0.2	~	
1000.00	999.28	999.18	0.2	 Image: A second s	
1900.00	1900.48	1900.28	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
10005.94	10.00	100.00	-99.97	9.99	10.00	1.00	 Image: A set of the set of the
	20.00	199.99	-199.93	19.98	20.00	1.00	\checkmark

Sensor Input

Measured at Target Current [µA]	Average Voltage [mV]	Voltage Sensor Input [mV]	Difference Found [mV]	MPE [mV]	Result
10.00	99.99	99.70	0.29	2.00	\checkmark
20.00	199.96	200.10	-0.14	2.00	\checkmark

* Reading from the DVM

Polarized Amperometric Sensor - As Found

Voltage Source						
Certified Value of Resistor [Ω]	Measured at Target Voltage [mV]	Positive Voltage Value* [mV]	Negative Voltage Value* [mV]	Average Voltage [mV]	MPE [mV]	Result
10005.94	1000.00	1003.07	-999.57	1001.32	10.00	
	2000.00	2002.12	-2000.06	2001.09	10.00	\checkmark

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Sensor Input

Measured at Target Voltage [mV]	Average Current [µA]	Current Sensor Input [µA]	Difference Found [µA]	MPE [µA]	Result
1000.00	100.07	100.17	-0.10	0.2	 Image: A second s
2000.00	199.99	199.99	0.00	0.2	\

* Reading from the DVM

Temperature Sensor Input Pt1000 - As Found

Pt1000 [°C]	Measured Value [°C]	Difference [°C]	MPE [°C]	Result
0	0.04	0.04	0.2	\checkmark
130	130.11	0.11	0.2	\checkmark

Generator Current Calibration - As Found

Nominal Current [mA]	Displayed Current Value [mA]	Voltage Value* [mV]	Calculated Current Value [mA]	Difference Found [mA]	MPE [mA]	Result
400	398.11	3621.01	398.409	0.299	0.600	\checkmark
300	298.57	2715.61	298.790	0.220	0.450	\checkmark
200	199.04	1810.12	199.162	0.122	0.300	\checkmark
100	99.50	904.77	99.549	0.049	0.150	\checkmark
0	0.00	0.02	0.002	0.002	0.050	 Image: A start of the start of

Additional Test Points

Nominal Current [mA]	Displayed Current Value [mA]	Voltage Value* [mV]	Calculated Current Value [mA]	Difference Found [mA]	MPE [mA]	Result
5	5.0060	5009.8000	5.00785	0.00185	0.00750	\checkmark
1	1.0009	1002.0610	1.00167	0.00077	0.00150	\checkmark

* Reading from the DVM

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Stroke of the Burette Drive As Found

Serial Number:

B733542923

Measured Values at 10% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	1	5001	5000	5000	0
2	1	5001	5000	5000	0
3	1	5001	5000	5000	0
x	1.00	5001.00	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	2	15000	14998	15000	-2
2	0	14998	14998	15000	-2
3	-1	14996	14997	15000	-3
x	0.33	14998.00	14997.67	15000	-2.33

Measured Values at 50% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	-2	24996	24998	25000	-2
2	1	24999	24998	25000	-2
3	3	25000	24997	25000	-3
x	0.67	24998.33	24997.67	25000	-2.33

Measured Values at 100% Burette Stroke

Measured	Zero Point [µM]	Max Value [µM]	Actual Value [µM]	Set Value [µM]	Deviation [µM]
1	1	50015	50014	50000	14
2	1	50013	50012	50000	12
3	1	50013	50012	50000	12
x	1.00	50013.67	50012.67	50000	12.67

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	14997.67	24997.67	50012.67
Absolute Deviation [µM]	0.00	2.33	2.33	12.67
Volume error calculated for 10mL burette [µL]	0.00	0.47	0.47	2.53
Max. Permissible Error [µM]	15	15	25	50
Result	\checkmark	\checkmark	\checkmark	\checkmark

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Digital Voltmeter			
Serial No:	3792003	Certificate No:	38252
Model Type:	Fluke 8846A	Last Certification Date:	24-01-2024
Supplier:	Viditec		
KF Resistor Unit			
Serial No:	TC02A0036	Certificate No:	2111-028/001
Supplier:	Metris	Last Certification Date:	29-11-2021
Micrometer			
Serial No:	5X00302	Certificate No:	0461/2022
Model Type:	1930001	Last Certification Date:	30-03-2022
Supplier:	Tesa		
mV Sensor Resistor			
Serial No:	TC01A0262	Certificate No:	027-21
Supplier:	Mettler Toledo	Last Certification Date:	08-03-2021
Temperature Resistors P	T100 & PT1000		
Serial No:	B303716895.1	Certificate No:	2203-002/001
Supplier:	Metris	Last Certification Date:	09-03-2022
Test Unit			
Serial No:	B307040839	Certificate No:	_TR-51105630
Serial No: Supplier:	B307040839 Mettler Toledo	Certificate No: Firmware Version:	TR-51105630 2.0.0

Remarks

Descargue el certificado del patrón utilizado en su calibración en

www.tecinstrumental.com dentro del menú Servicio Técnico --> Patrones Vigentes.

Se realizo mantenimiento preventivo y engrase del motor