Calibration Certificate ID

TW0465-002-102522-ACC

Service Provider

2F,NO.17,Lane 171,Jiu Zong Rd., Sec.2 Taipei 1149

N/A

N/A

Accuracy Calibration Certificate

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		
City:	台北市	**Contact:**	楊崇孝(HANK)
Zip / Postal:	114	**Order Number:**	JOB000031084
State / Province:	N/A		

Weighing Device

Manufacturer:	Mettler Toledo	**Instrument Type:**	Weighing Instrument
Model:	XP205	**Asset Number:**	SVC-X19
Serial No.:	1128131694	**Terminal Model:**	PAT/04
Building:	安傳電子	**Terminal Serial No.:**	B134203383
Floor:	2F	**Terminal Asset No.:**	N/A
Room:	維修室	**Alternate Asset No.:**	N/A

Range	Max. Capacity	Readability (d)
1	220 g	0.00001 g

Procedure

Calibration Guideline:	EURAMET cg-18 v. 4.0 (11/2015)
METTLER TOLEDO Work Instruction:	General_SOP_ACC_30260953

This calibration certificate contains measurements for As Found and As Left calibrations.

The sensitivity/span of the weighing instrument was adjusted before As Left calibration with a built-in weight.

As Found Calibration Date:	25-10-2022	**Service Technician:**	Kevin Tseng
As Left Calibration Date:	25-10-2022		
Issue Date:	25-10-2022		
Next Calibration Date:	24-10-2023		

瑞士商梅特勒托利多(股)台灣分公司 校正專用

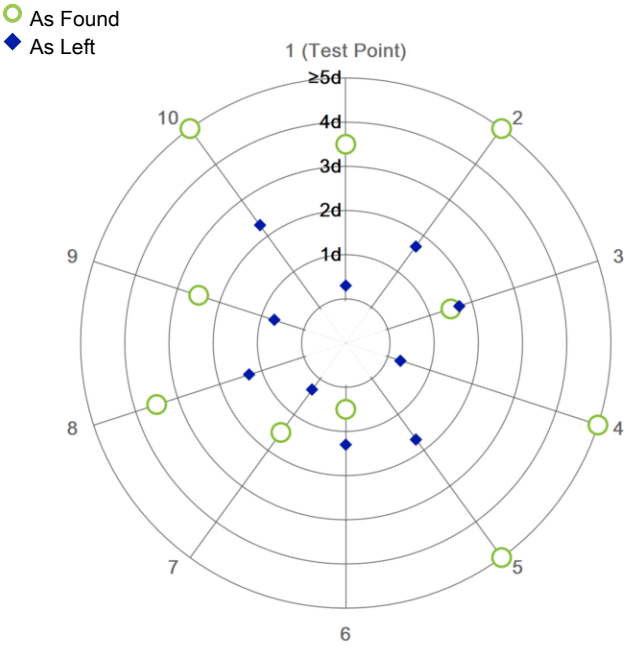
Measurement Results

Repeatability

Test Load: 200 g

	As Found	As Left
1	199.99976 g	200.00011 g
2	199.99980 g	200.00013 g
3	199.99974 g	200.00013 g
4	199.99980 g	200.00011 g
5	199.99966 g	200.00013 g
6	199.99972 g	200.00010 g
7	199.99971 g	200.00011 g
8	199.99969 g	200.00010 g
9	199.99970 g	200.00012 g
10	199.99967 g	200.00009 g

Standard Deviation	**0.000049 g**	**0.000014 g**



The "d" in the graph represents the readability of the range/interval in which the test was performed.

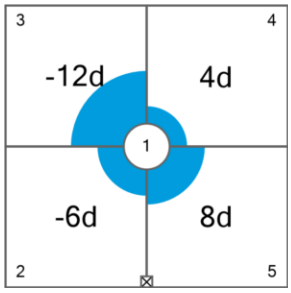
The results of this graph are based upon the absolute values of the differences from the mean value.

Eccentricity

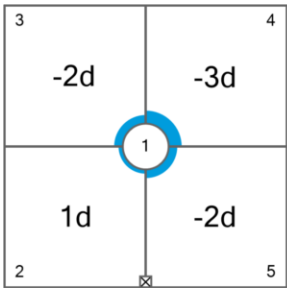
Test Load: 100 g

Position	As Found	As Left
1	100.00001 g	99.99996 g
2	99.99995 g	99.99997 g
3	99.99989 g	99.99994 g
4	100.00005 g	99.99993 g
5	100.00009 g	99.99994 g

Maximum Deviation	**0.00012 g**	**0.00003 g**



As Found



As Left

The "d" in the graph represents the readability of the range/interval in which the test was performed.

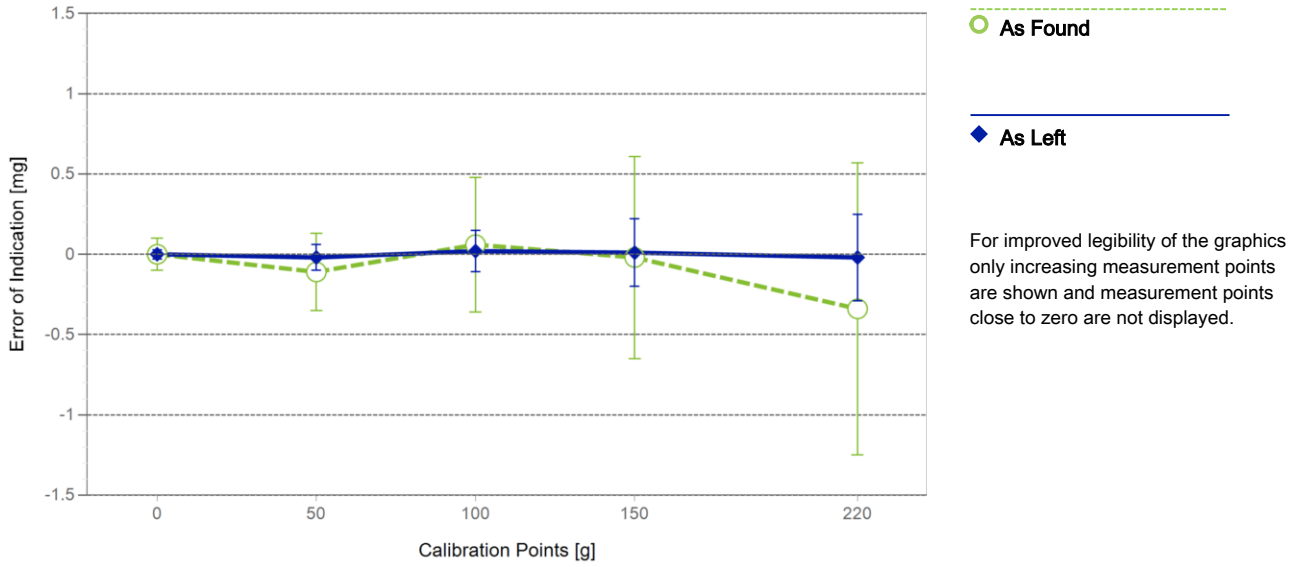
Error of Indication

As Found

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.099 mg	2
2	50.00002 g	49.99991 g	-0.00011 g	0.24 mg	2
3	99.99995 g	100.00001 g	0.00006 g	0.42 mg	2
4	149.99997 g	149.99995 g	-0.00002 g	0.63 mg	2
5	220.00006 g	219.99972 g	-0.00034 g	0.91 mg	2

As Left

	Reference Value	Indication	Error of Indication	Expanded Uncertainty	k
1	0.00000 g	0.00000 g	0.00000 g	0.029 mg	2
2	50.00002 g	50.00000 g	-0.00002 g	0.081 mg	2
3	99.99995 g	99.99997 g	0.00002 g	0.13 mg	2
4	149.99997 g	149.99998 g	0.00001 g	0.21 mg	2
5	220.00006 g	220.00004 g	-0.00002 g	0.27 mg	2



For improved legibility of the graphics only increasing measurement points are shown and measurement points close to zero are not displayed.

The uncertainty stated is the expanded uncertainty at calibration obtained by multiplying the standard combined uncertainty by the coverage factor k – which can be larger than 2 according to EURAMET cg-18. The value of the measurand lies within the assigned range of values with a probability of approximately 95%.

The user is responsible for maintaining environmental conditions and the settings of the weighing instrument when it was calibrated.

Measurement Uncertainty of the Weighing Instrument in Use

Stated is the expanded uncertainty with k=2 in use. The formula shall be used for the estimation of the uncertainty under consideration of the errors of indication. The value R represents the net load indication in the unit of measure of the device.

Temperature coefficient for the evaluation of the measurement uncertainty in use: $1.0 \cdot 10^{-6}$ / K

Temperature range on site for the evaluation of the measurement uncertainty in use: 4 K

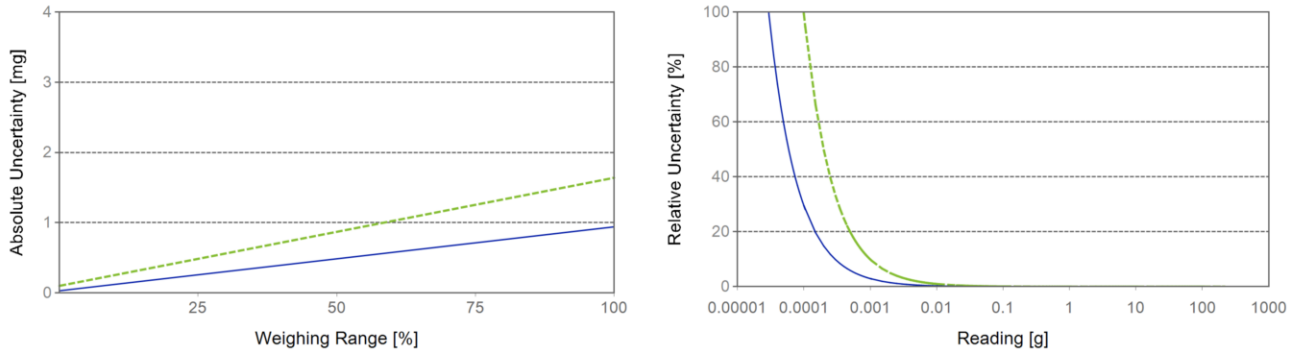
Linearization of Uncertainty Equation

	Range		As Found	As Left
	d	Max		
1	0.00001 g	220 g	U_1 = 0.099 mg + 0.00700 mg/g · R	U_1 = 0.030 mg + 0.00414 mg/g · R

To optimize the stability of the linearization, besides of the zero load only increasing measurement points with a test load of 5% of the measurement range or larger are taken for the calculation of the linear equation.

Absolute and Relative Measurement Uncertainty in Use for Various Net Indications (Examples)

Net Indication	As Found		As Left	
0.00220 g	0.099 mg	4.5%	0.030 mg	1.4%
0.02200 g	0.099 mg	0.45%	0.030 mg	0.14%
0.22000 g	0.10 mg	0.046%	0.031 mg	0.014%
2.20000 g	0.11 mg	0.0052%	0.039 mg	0.0018%
220.00000 g	1.6 mg	0.00075%	0.94 mg	0.00043%



As Found **As Left**

Test Equipment

All weights used for metrological testing are traceable to national or international standards. The weights were calibrated and certified by an accredited calibration laboratory.

Weight Set 1: OIML E2

Weight Set No.:	SVC-W060	Date of Issue:	17-11-2021
Certificate Number:	21C400741	Calibration Due Date:	16-11-2022

Remarks

This document is issued to record completion of the work performed by METTLER TOLEDO on the subject device in accordance with agreed standards. It does not guarantee the continued performance of the subject device. Any measurements recorded are based on the subject device's performance at a given time as tested by METTLER TOLEDO and, except where explicitly stated otherwise, do not express an opinion as to the sufficiency of any customer designed procedures used to test the device. This document is not a warranty, either implied or express. METTLER TOLEDO expressly disclaims any liability arising from the use of the information in this document for any purpose other than as specified herein.

METTLER TOLEDO Service

GWP® Certificate

As Found

The weighing device meets the given process requirements.

As Left

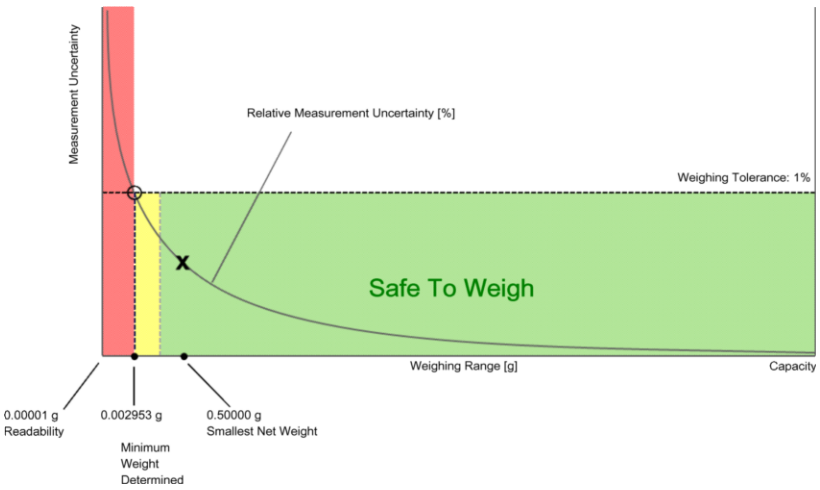
The weighing device meets the given process requirements.

Tests Performed: ☑ As Found ☑ As Left

Process Requirements

Weighing Tolerance: **1%** | Smallest Net Weight: **0.50000 g** | Safety Factor: **2**

Safe Weighing Range



While the values in this graph reflect the actual calibration results, the measurement uncertainty curves are simply a visual representation. This graph reflects As Left testing, unless only As Found was performed.

Minimum Weight

As Found Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	**1**	**2**	**3**	**5**	**10**
0.1%	0.100031 g	0.201483 g	0.304385 g	0.514668 g	1.068073 g
0.2%	0.049840 g	0.100031 g	0.150578 g	0.252751 g	0.514668 g
0.5%	0.019894 g	0.039844 g	0.059850 g	0.100031 g	0.201483 g
1%	0.009940 g	0.019894 g	0.029862 g	0.049840 g	0.100031 g
2%	0.004968 g	0.009940 g	0.014915 g	0.024876 g	0.049840 g
5%	0.001987 g	0.003974 g	0.005962 g	0.009940 g	0.019894 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

As Left Minimum Weight Table

Minimum weights for different weighing tolerances and safety factors					
	Safety Factor				
Tolerance	**1**	**2**	**3**	**5**	**10**
0.1%	0.029637 g	0.059522 g	0.089657 g	0.150691 g	0.307888 g
0.2%	0.014788 g	0.029637 g	0.044548 g	0.074558 g	0.150691 g
0.5%	0.005908 g	0.011825 g	0.017753 g	0.029637 g	0.059522 g
1%	0.002953 g	0.005908 g	0.008865 g	0.014788 g	0.029637 g
2%	0.001476 g	0.002953 g	0.004430 g	0.007386 g	0.014788 g
5%	0.000590 g	0.001181 g	0.001771 g	0.002953 g	0.005908 g

Pass: The determined minimum weight meets the requirement for the smallest net weight.

At these net minimum weight values, the measurement uncertainty of the weighing device is equal to or less than 1/1 (no safety factor), 1/2, 1/3, 1/5, or 1/10 of the required tolerance. The values are calculated with k = 2 and based on the linear formula of the measurement uncertainty of the weighing device in use.

The safety factor for As Found is always 1. This implies no safety factor. As Found testing looks at the behavior of the instrument from the past until test occurred. For the past, it is necessary to know that the tolerance was met, but not the safety factor. The safety factor is a proactive measure to apply for future measurements.

Notes on minimum weight values in above table:

1. If "N/A" is shown above, no appropriate value could be calculated.
2. METTLER TOLEDO is not responsible for the definition of the process requirements.

Measurement Results

Results Summary

	Repeatability	Eccentricity	Error of Indication
As Found	✓	✓	✓
As Left	✓	✓	✓

✓ = Passed

✗ = Failed

⚠ = Safety Factor not met

Repeatability

Test Load: 200 g

		As Found		As Left	
Tolerance	Control Limit	Std. Deviation	Result	Std. Deviation	Result
0.1%	0.000250 g	0.000049 g	✓	0.000014 g	✓
0.2%	0.000500 g		✓		✓
0.5%	0.001250 g		✓		✓
1%	0.002500 g		✓		✓
2%	0.005000 g		✓		✓
5%	0.012500 g		✓		✓

The weighing tolerance is met if the standard deviation is less than or equal to the corresponding control limit.

Eccentricity

Test Load: 100 g

		As Found		As Left	
Tolerance	Control Limit	Deviation	Result	Deviation	Result
0.1%	0.05000 g	0.00012 g	✓	0.00003 g	✓
0.2%	0.10000 g		✓		✓
0.5%	0.25000 g		✓		✓
1%	0.50000 g		✓		✓
2%	1.00000 g		✓		✓
5%	2.50000 g		✓		✓

The weighing tolerance is met if the deviation is less than or equal to the corresponding control limit.

METTLER TOLEDO Service

Error of Indication

As Found

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.00002 g	-0.00011 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
99.99995 g	0.00006 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
149.99997 g	-0.00002 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
220.00006 g	-0.00034 g	0.11000 g	0.22000 g	0.55000 g	1.10000 g	2.20000 g	5.50000 g
Result		✓	✓	✓	✓	✓	✓

As Left

		Control limits for various weighing tolerances					
Reference Value	Error	0.1%	0.2%	0.5%	1%	2%	5%
0.00000 g	0.00000 g	N/A	N/A	N/A	N/A	N/A	N/A
50.00002 g	-0.00002 g	0.02500 g	0.05000 g	0.12500 g	0.25000 g	0.50000 g	1.25000 g
99.99995 g	0.00002 g	0.05000 g	0.10000 g	0.25000 g	0.50000 g	1.00000 g	2.50000 g
149.99997 g	0.00001 g	0.07500 g	0.15000 g	0.37500 g	0.75000 g	1.50000 g	3.75000 g
220.00006 g	-0.00002 g	0.11000 g	0.22000 g	0.55000 g	1.10000 g	2.20000 g	5.50000 g
Result		✓	✓	✓	✓	✓	✓

The weighing tolerance is met if the error (of indication) for each test point is less than or equal to the corresponding control limit for that particular weighing tolerance. Results at or close to the zero point cannot be assessed.