



MING DENG METROLOGY SERVICES PTE LTD

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CALIBRATION REPORT MDF170619-3

Issue to : **GES (Singapore) Pte Ltd**
28 Marsiling Lane
Singapore 739152

Description : **WEIGHING SCALE**
Manufacturer : AND (HR-200)
Serial Number : 12333783 (93372)
Capacity : 0 - 210g
Graduation : 0.0001g
Date of Calibration : 29 Nov 2017
Date of Issue : 13 Dec 2017
Date Due : 29 May 2018
Ambient Temperature : 21.5 °C
Relative Humidity : 47 % relative humidity
Location : Production

Calibration Method

As generally given in In-house Procedure MDCP-20 : 2005.

Repeatability

The repeatability was expressed as a standard deviation together with the relative size of the maximum difference between two successive readings. The repeatability was determined at near zero, half maximum and maximum load of the weighing scale. The largest standard deviation was selected as the repeatability of the weighing scale.

Linearity

The linearity of the weighing scale was determined by placing known masses on the pan in increasing steps up to its maximum capacity of 200g. The difference between the applied mass and the corresponding actual readings were calculated as the errors of the scale readings.

Off-centre

The off-centre loading result was determined by placing a mass of 100g for the 0 to 200g range and moving the mass to various positions on the pan. The maximum difference between the readings was then obtained.

Hysteresis

The hysteresis of the weighing scale was determined using a mass of 75g for the 0 to 200g range, applied at an increasing and decreasing directions on the pan up to the maximum load. The difference between the indicated values and that of the applied mass was determined.

Reference Standard Used

Standard Weights S/No: M105, traceable to NIM(Thailand) via Report No: MDL170482 & MTL170883.

Calibration Result

The expanded uncertainty is $\pm 0.0001g$, at approximately 95% confidence level with coverage factor, $k = 2$. The requirements stated in this report are taken from Manufacturer's Specification, $\pm 0.0002g$. The user should decide on the usability and recalibration interval of this item based on its requirements and intended use.

Calibrated by :

Ethan Lee
Calibration Officer

Reviewed by :

Ashley Chin
Approving Officer

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Calibration Results

Repeatability of Reading

Applied Mass (g)	Standard Deviation of Reading (g)	Maximum Difference Between Successive Readings (g)
5.0000	0.00003	0.0000
75.0000	0.00003	0.0000

Linearity and Errors of the Weighing Scale

Applied Mass (g)	Actual Reading (g)	Error (g)
0.0000	0.0000	0.0000
0.2000	0.2000	0.0000
0.5000	0.5000	0.0000
1.0000	0.9999	- 0.0001
2.0000	2.0000	0.0000
3.0000	2.9999	- 0.0001
4.0001	4.0001	0.0000
5.0000	4.9999	- 0.0001
5.9999	5.9998	- 0.0001
10.0000	10.0001	+ 0.0001
50.0001	50.0000	- 0.0001
100.0000	99.9998	- 0.0002
200.0000	199.9998	- 0.0002

Off-Centre Loading

Position on the pan	Centre	Front	Back	Left	Right	Maximum Difference
Reading (g)	99.9998	99.9992	100.0003	99.9997	99.9996	0.0011

Hysteresis

Load (g)	Hysteresis (g)
75.0000	< 0.0001

Note: The user is recommended to re-verify the performance of the weighing scale on site prior to use.

Calibrated by :

Ethan Lee
Calibration Officer

H.C. Tan
19-DEC-17