



# MING DENG METROLOGY SERVICES PTE LTD

Company Registration No.: 199701342C  
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## CALIBRATION REPORT MDF200015-1

**Issue to** : **Flextronics Manufacturing (Singapore) Pte Ltd**  
No. 1, Kallang Place  
Singapore 339211

**Description** : **WEIGHING SCALE**  
**Manufacturer** : AND (HR-200)  
**Serial Number** : 12305757 (0206)  
**Capacity** : 0 - 210g  
**Graduation** : 0.0001g  
**Date of Calibration** : 13 Jan 2020  
**Date of Issue** : 16 Jan 2020  
**Date Due** : 13 Jul 2020  
**Ambient Temperature** : 21.9 °C  
**Relative Humidity** : 62.5 % relative humidity  
**Location** : Production

|                                              |
|----------------------------------------------|
| <b>REVIEWED &amp; ACCEPTED</b>               |
| <b>SIGN:</b> CHANG MEI LAN                   |
| <b>DATE:</b> 31 JAN 2020                     |
| <b>REMARKS:</b> EQID 0206<br>JOB 31 JAN 2020 |

### 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 SI units through NMC(Singapore) & NIM(Thailand) via Report No: MDL190571-1 & MTL190924; due date: 01 Mar 2020.

### Calibration Result

The expanded uncertainty is  $\pm 0.0001g$ , at approximately 95% confidence level with coverage factor,  $k = 2$ .

No adjustment was done unless After Adjustment readings are reported.

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.

This calibration report only applies to the calibration of this item.

Calibrated by :

Treerayut Soodtumrong  
Calibration Officer

Reviewed by :

Koo Chih Wei  
Approving Officer



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### Calibration Results

#### Repeatability of Reading

| Applied Mass<br>(g) | Standard Deviation<br>of Reading<br>(g) | Maximum Difference Between<br>Successive Readings<br>(g) |
|---------------------|-----------------------------------------|----------------------------------------------------------|
| 5.0000              | 0.00003                                 | 0.0000                                                   |
| 75.0000             | 0.00003                                 | 0.0001                                                   |

#### Linearity and Errors of the Weighing Scale

| Applied Mass<br>(g) | Actual Reading<br>(g) | Error<br>(g) |
|---------------------|-----------------------|--------------|
| 0.0000              | 0.0000                | 0.0000       |
| 0.2000              | 0.2000                | 0.0000       |
| 0.5000              | 0.5001                | + 0.0001     |
| 1.0000              | 0.9999                | - 0.0001     |
| 2.0000              | 2.0000                | 0.0000       |
| 3.0000              | 2.9999                | - 0.0001     |
| 4.0000              | 4.0000                | 0.0000       |
| 5.0000              | 5.0000                | 0.0000       |
| 6.0000              | 6.0000                | 0.0000       |
| 10.0000             | 9.9999                | - 0.0001     |
| 50.0000             | 49.9999               | - 0.0001     |
| 100.0000            | 100.0001              | + 0.0001     |
| 200.0000            | 200.0001              | + 0.0001     |

#### Off-Centre Loading

| Position<br>on the pan | Centre  | Front   | Back    | Left     | Right   | Maximum<br>Difference |
|------------------------|---------|---------|---------|----------|---------|-----------------------|
| Reading (g)            | 99.9999 | 99.9998 | 99.9999 | 100.0000 | 99.9998 | 0.0002                |

#### 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 :   
Treerayut Soodtumnong  
Calibration Officer