Calibration, Use, and Maintenance of Mettler Toledo MS303S Balance

1. SCOPE AND APPLICATION

1.1. This procedure is based on the Mettler Toledo NewClassic Balances MS-S/MS-L Models Operating Instructions. It can be used for determining the weight of items within the range (0.001 g – 320 g) of the balance.

2. SUMMARY OF THE METHOD

2.1. The Mettler Toledo MS303S balance has an automatic internal calibration that occurs daily and when ambient conditions change. The balance is checked with Class-2 weights prior to each use and with all Class-1 weights quarterly. After checking with Class-2 weights, the balance is zeroed or tared as appropriate. Items to be weighed are placed on the instrument weighing pan. After the display stabilizes, the weight is recorded. When weighing is complete, the balance is turned off and cleaned.

2.2. Interferences

2.2.1. Drafts, moisture, direct sunlight, temperature change, contaminated Class-1 weights or Class-2 weights and weighing dishes can cause measurements to be inaccurate. Make sure the position of the balance is stable, free from vibration, and horizontal as much as possible.

3. EQUIPMENT AND SUPPLIES

3.1. Calibration Check

3.1.1. MS303S balance (S/N B247544008)

3.1.2. Class-1 weights

Note: Do not touch any of the weights with bare skin. Oil from skin can cause the weights to be inaccurate. Only the forceps that are included with the weights should be used to handle them. Do not set the weights on ANY surface other than a clean weighing pan.

3.1.3. Dust brush

3.1.4. *Mettler MS303S Calibration Log*

3.2. Weighing

3.2.1. MS303S balance (S/N B247544008)

3.2.2. Class-2 weights

3.2.2.1. Class-2 weights have been compared to certified Class-1 weights and are used for daily measurements. Use of the Class-2 weights protects Class-1 weights from contamination or damage that might be incurred by daily use.

Note: Do not touch any of the weights with bare skin. Oil from skin can cause the weights to be inaccurate. Only the forceps that are included with the weights should be used to handle them. Do not set

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the weights on ANY surface other than a clean weighing pan.

3.2.3. Weigh boats

3.2.4. Dust brush

3.2.5. *Mettler MS303S Daily Use Log*

3.2.6. Spatula

4. MANUAL CALIBRATION (PERFORM AS NECESSARY)

4.1. Ensure that the weighing pan is unloaded.

4.2. Clean the weighing pan gently with the dust brush and close the doors.

4.3. Check the level indicator to ensure the balance is level. If it is not, level the balance by turning the leveling feet underneath the front of the balance until the bubble is in the middle of the level glass. The balance must be leveled and adjusted each time it is moved to a new location. See Table 1 for more information on adjusting the leveling feet.

Table 1

Where is the air bubble?	**Turn feet in this direction**
12 o'clock	Both feet clockwise
3 o'clock	Left foot clockwise, right foot counterclockwise
6 o'clock	Both feet counterclockwise
9 o'clock	Left foot counterclockwise, right foot clockwise

4.4. Turn the balance on.

4.5. On the right side of the display, press the third button from the top. The balance will perform an automatic calibration. The balance will display "ADJ DONE" when the calibration is complete. Record the calibration in the *Mettler MS303S Calibration Log*.

5. WEIGHING

5.1. Two Class-2 weights that bracket the sample mass (or range of masses) must be weighed prior to use.

5.2. Ensure that the weighing pan is unloaded.

5.3. Inspect and clean the weighing pan with the dust brush as necessary.

5.4. Turn the balance on by pressing the **On/Off** key.

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5.5. If the balance does not display "0.000 g", ensure that the doors of the draft shield are all closed and press the **[→0/T←]** key.

5.6. Place one Class-2 weight on the balance and close the doors of the draft shield.

5.7. Wait for the instability detector ("**O**") located in the bottom left of the display to disappear and for the stability beep to sound.

5.8. Remove the weight from the weighing pan.

5.9. Repeat steps 5.3 – 5.7 for the second Class-2 weight and record the weights in the *Mettler MS303S Daily Use Log*. If the Class-2 weights are not within the tolerances found in the *Mettler MS303S Daily Use Log*, manually calibrate the balance as described in step 4.

5.10. Place a weigh boat on the weighing pan. Ensure that the doors of the draft shield are all closed and press the **[→0/T←]** key to tare the balance. "0.000 g" should be displayed.

5.11. Use the spatula to add the substance to be weighed to the weigh boat. As the desired weight is approached, reduce the rate of substance addition. If the desired weight is exceeded, use the spatula to remove any excess. Be aware that some reagents may not be returned to their original containers and must be disposed of properly. Closing the doors of the draft shield between substance additions prevents drafts from skewing the weight.

5.12. Wait for the instability detector ("**O**") located in the bottom left of the display to disappear and for the stability beep to sound before recording the weight.

5.13. Remove the weigh boat from the weighing pan.

5.14. Repeat steps 5.10 – 5.13 for all items to be weighed.

5.15. Turn the balance off by holding down the **On/Off** key until "SHUTOFF" appears on the display.

5.16. Clean any spilled substances from the balance. The weighing pan, pan support, bottom plate, and draft shield can be removed from the balance for cleaning.

6. MAINTENANCE

6.1. The balance should be cleaned monthly when the microbiology lab hood is cleaned, as indicated in the *Micro QC Checklist*.

6.2. Disconnect the balance from the power supply.

6.3. Remove the weighing pan, pan support, and bottom plate.

6.4. Unlock the draft shield by turning the draft shield lock one click counterclockwise to the unlock position (), lift the draft shield off the balance, and place it on a clean surface.

6.5. Push back the two side glass doors of the draft shield.

6.6. Turn the two lock covers (gray squares) at the top of the front of the draft shield as far back as they will go.

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6.7. Tilt the front glass forward and lift to remove it.

6.8. Slide the top glass door out from the front.

6.9. Lift the side glass doors as they are pulled out from the front.

6.10. Push the white lock button at the top of the back of the draft shield (under the ledge of the frame) to release the rear glass and lift up to remove it.

6.11. Turn the draft shield lock one more click counterclockwise to the service (🔧) position and remove it.

6.12. Clean all components and reinstall in the reverse order.

7. QUALITY CONTROL

7.1. Quarterly, weigh and record all Class-1 weights. Notify a supervisor if the Class-1 weights are not within the tolerances found in the *Mettler MS303S Calibration Log*.

8. REFERENCES

8.1. Mettler Toledo New Classic Balances MS-S/MS-L Models Operating Instructions

APPENDIX OF CHANGES

01/23/2015	Formatted for SOP compliance.
10/02/2019	The name of this SOP was changed from PCR-2.1-1.4 to BB-035-1.0
09/08/2022	Updated Class-1 weight quality control checks to be done quarterly. Updated naming convention of Class-S and Class-R weights.
08/24/2023	Edited to improve formatting and consistency. Expanded section 2.2 to include more interferences and section 4.3 to clarify when manual calibration occurs.
09/21/2023	Edited and reformatted to clarify instructions and improve sentence flow.

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