Calibration, Use, and Maintenance of Mettler Toledo XA105DU Balance

1. SCOPE AND APPLICATION

    1.1. This procedure is based on the Mettler Toledo Excellence Analytical Balances XA Models Operating Instructions. It can be used for determining the weight of items within the range (0.01 mg – 120 g) of the balance.

2. SUMMARY OF THE METHOD

    2.1. The Mettler Toledo XA105DU balance has an automatic internal calibration that occurs 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 grid 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, leftover spilled media, and weighing dishes can cause measurements to be inaccurate. Make sure the position of the balance is stable, free from vibration, horizontal, and the balance is clean as much as possible.

3. EQUIPMENT AND SUPPLIES

    3.1. Calibration Check

        3.1.1. XA105DU balance (S/N B314195659)

        3.1.2. Class-1 weights

            Note: Do not touch any of the weights with bare skin. Oil from skin can cause the weight readings 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 XA105DU Calibration Log*

    3.2 Weighing

        3.2.1. XA105DU balance (S/N B314195659)

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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 weight readings 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.

3.2.3. Weighing container

3.2.4. Dust brush

3.2.5. *Mettler XA105DU Daily Use Log*

3.2.6. Spatula

4. MANUAL CALIBRATION (PERFORM AS NECESSARY)

4.1. Ensure that the grid weighing pan is unloaded.

4.2. Clean the grid 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 back 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.

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4.5. On the bottom right side of the display screen, touch the **Adjust .int** icon (). The balance will perform an automatic calibration. The balance will display "Adjustment done" when the calibration is complete. Record the calibration in the *Mettler XA105DU 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 grid weighing pan with the dust brush as necessary

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

5.5. If the balance does not display "0.00000 g", ensure that the doors of the draft shield are all closed and press the **[→0←]**key. Always use the **[→0←]** zeroing keys before you start with weighing, especially before recording a tare weight (using the **[→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 icon ("**O**") located in the top left of the display to disappear before recording the weight.

5.8. Remove the weight from the weighing pan.

5.9. Repeat steps 5.5 – 5.8 for the second Class-2 weight and record the weights in the *Mettler XA105DU Daily Use Log*. If the Class-2 weights are not within the tolerances found in the *Mettler XA105DU 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 **[→T←]** key to tare the balance. "0.00000 g" should be displayed.

> **Note:** This balance has some ErgoClip attachments that can be used to make weighing easier. Turn off the balance and remove the grid weighing pan from the balance before snapping any ErgoClips onto the grid weighing pan. Gently hang the grid weighing pan back in the weighing chamber with the ErgoClip attached. Turn the balance back on.

5.11. Use the spatula to add the substance you are weighing to the weigh boat. As the desired weight is approached, reduce the rate of substance addition. If the desired

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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 any substance additions prevents drafts from skewing the weight.

5.12. Wait for the stability detector ("**O**") located in the top left of the display to disappear before recording the weight.

5.13. Remove the weigh boat from the weighing pan. Repeat steps 5.10– 5.13 for all items to be weighed.

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

5.15 Clean any spilled substances from the balance. The weighing pan and drip tray can be removed from the balance for cleaning.

6. MAINTENANCE

6.1. The balance should be cleaned monthly with a mild cleaning agent as indicated in the *Micro QC Checklist*

6.2. Disconnect the balance from the power supply.

6.3. Slide the top glass panel partially back. Rotate the side and front glass panels of the draft shield down and away and the top glass panel up and away from the balance and pull them out of their fastenings.

Note: Grip the side and front glass panels at the top in the center. Grip the top glass panel at the front in the center.

6.4. Carefully raise the front of the grid weighing pan and lift it out of the guide.

6.5. Pull the drip tray up from the front and away from the balance.

6.6. Clean all components with 90% alcohol before reinstalling them 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 XA105DU Calibration Log*.

8. REFERENCES

8.1. Mettler Toledo Excellence Analytical Balances XA Models Operating Instructions

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APPENDIX OF CHANGES

01/23/2015	Formatted for 508 compliance.
10/02/2019	The name of this SOP was changed from PCR-2.2-1.4 to BB-036-1.0
09/22/2020	Included more interferences of the Mettler Toledo XA105DU; desired stable Position for XA balances; corrected name of stable detector icon according to Mettler Toledo operating instructions.
09/08/2022	Updated Class-1 weight quality control checks to be done quarterly. Updated naming convention of Class-R and Class-S weights.
08/24/2023	Edited to clean up formatting and make this SOP more concise. Expanded section 5.11 to include the use of a spatula.
11/19/2025	Edits included clarifying Section 2.2, correcting grammar, standardizing numbered-list formatting, and refining language for improved accuracy and consistency throughout the document.

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