Calibration and Use of Mettler Toledo PB403-S/FACT Balance

1. SCOPE AND APPLICATION

1.1. This method is based on the Mettler Toledo application manual for the Mettler Toledo B-S/FACT line of balances. It is applicable to the Mettler Toledo PB403-S/FACT balance and can be modified for similar balances. This method covers the basic functions of weighing, taring and calibration. ASTM Class 2 (called Class 2 weights for the remainder of the document) weights are certified. ASTM Class 1 (referred to as Class 1 weights for the remainder of the document) weights have been checked/compared to Class 2 weights within the laboratory. The PB403-S/FACT weighs to 0.001 grams. The maximum allowable load is 410 grams.

2. SUMMARY OF METHOD

2.1. The Mettler Toledo PB403-S/FACT balance is checked with Class 1 weights during each use. The balance is calibrated (internal calibration) every three months, anytime it's moved, or when Class 1 weights are not within tolerance. Once a quarter, the balance is checked with all Class 1 weights. Annually, the balance is checked with a set of Class 2 weights bracketing measurements used alongside Class 1 weights. Class 1 weight measurements are recorded on appropriate bench sheets and logbooks (Calibration and Daily Use).

2.1.1. Use of this SOP constitutes acknowledgement that the user has read the appropriate (weighing, taring and calibration) sections of the Mettler Toledo application manual for the Mettler Toledo B-S/FACT line of balances. It is presumed that the balance has been used and has remained in a specific location. Anytime there appears to be a problem (Class 1 weights and/or calibration out of tolerance), a supervisor must be notified.

2.2. Interferences:

2.2.1. Air currents, temperature (>± 2ºC of room temperature), vibrations, dirty calibration weights, improper calibration, or taring.

3. EQUIPMENT AND SUPPLIES

3.1. Calibration weights (Class 1 weights) or (Class 2 weights)

3.2. PB403-S/FACT balance

3.3. Small flat-blade screwdriver

3.4. *Mettler PB403-S/FACT Ser. # 1128150043 calibration logbook*

3.5. *Mettler PB403-S/FACT Ser. # 1128150043 daily use log.*

3.6. Spatula

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3.7. Weigh boats

4. PREPARATION (CALIBRATION)

Note: Calibration is performed before the balance is used for the first time, at regular intervals during the service life of the balance, after change of location and when Class 1 weights/Class 2 weights are out of tolerance.

4.1. Ensure that the weighing pan is unloaded. Switch the balance on by pressing and then immediately releasing the **[on]** key (left side of key 'board'). The display should light up for several seconds, giving a function check of the display. After the display check is completed, the display should show '0.000g'.

4.2. Press and hold the **[Cal/Menu]** key down until 'cal' appears on the display, then release the key. The balance automatically calibrates itself. The message 'CAL done' appears briefly in the display; followed by '0.000g' Record calibration in *Mettler PB403-S/FACT Ser. # 1128150043 calibration logbook*.

4.3. Quarterly, weigh and record all Class 1 weights. Annually, weigh and record all Class 2 weights. Notify supervisor if Class 1 weights are not within tolerances as found in the calibration logbook. Weight sets should be handled with the forceps provided in the weight box. The weights should not be touched by flesh nor be set on any surface (outside the storage box) other than the weighing platform.

5. PREPARATION (WEIGHING)

5.1. If the balance is not on, perform 4.1.

5.2. If '0.000g' is not displayed, press and immediately release the **[O/T]** key (middle of the key 'board'). '0.000g' should be displayed.

5.3. Choose 2 weights (Class 1 weights or Class 2 weights) which bracket the weight or range of weights to be measured; then weigh and record the measured weight and record the nominal weight of the Class 1 weights/Class 2 weights on the appropriate bench sheet and the *Mettler PB403-S/FACT Ser. # 1128150043 daily use log.*

5.3.1. If either of the weights is out of tolerance, notify a supervisor.

5.4. Place the properly sized weigh boat for the substance/object being weighed on the balance platform. Chemicals and/or objects that can damage the balance platform must never be placed directly on the balance platform.

5.5. If using a weigh boat, after placing the weigh boat on the balance platform, press **[O/T]** to tare the balance. Add the substance/object to be weighed to the weigh boat. Record the displayed weight. Otherwise, place the object to be weighed on the platform balance, record the displayed weight.

5.6. If weighing a set amount of a substance, add the substance to the weigh boat until the desired weight is displayed. Use a clean spatula to remove any excess from the weigh boat.

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5.7. To make more than one weight measurement, remove the weighed object or weigh boat and repeat 5.4 – 5.5.

5.8. To turn off the balance, press and hold the **[on]** key for three seconds.

5.9. Clean the balance by brushing/wiping any spilled substances.

6. DATA ARCHIVAL

6.1. Use a black, waterproof pen for all bench sheets and logbooks.

6.2. Record weights as appropriate on bench sheets and in the *Mettler PB403-S/FACT Ser. # 1128150043 calibration* logbook and the *Mettler PB403-S/FACT Ser. # 1128150043 daily use log*.

6.3. To correct raw data entries, place a single line through the incorrect or illegible entry. Write the corrected entry near the error, date and initial the correction. Do not overwrite entries.

6.3.1. The corrected entry is written as near as possible to the error or in the comment box on the appropriate bench sheet.

6.3.2. If the correction requires an explanation, write a comment and reference the error. Initial and date the explanation. Do not attempt to put all information (correction and comments) into a small space

6.3.3. Use sequential alphabetical annotation to identify errors and corresponding comments (use A for first error and use A for corresponding explanatory comment; use B for second error, etc.).

7. QUALITY CONTROL

7.1. Ensure Class 1 weights are within listed tolerances and are either checked annually against the Chemistry lab Class 2 weights, or they have been recertified.

8. SAFETY/HAZARDOUS WASTE MANAGEMENT

8.1. Proper laboratory protection, including lab hood or ventilation system, lab coat, gloves, and safety glasses, is required when working with chemicals and unprocessed samples.

8.2. Refer to the Laboratory Quality Manual for sample disposal.

8.3. Refer to the Laboratory Health and Safety Manual and Hazardous Waste Management).

8.4. Read MSDS information for reagent handling and disposal.

9. REFERENCES

9.1. Mettler Toledo Application Manual for the Mettler Toledo B-S/FACT line of balances

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9.2. Laboratory Quality Manual DEP Laboratory Quality Assurance Manual and SOPs | Florida Department of Environmental Protection

9.3. DEP Laboratory Health and Safety Manual https://www.floridadep.net/resources/health-safety-manual

Appendix of Significant Changes

3/25/2020	Updated links. Changed font from Times New Roman to Calibri.
3/11/2022	Made minor edits.
3/24/2022	Changed “S-weights” to “ASTM Class 1 weights” and “R-weights” to “ASTM Class 0 weights.” Updated links.
5/05/2023	Changed mentions of monthly five weight checks to quarterly all weight checks. Class 2 weights were incorrectly referred to as Class 0 weights in previous version of SOP. Class 0 to Class 2 corrections have been made.

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