

**Frederick National Laboratory
for Cancer Research**

sponsored by the National Cancer Institute

Vaccine, Immunity and Cancer Directorate
Standard Operating Procedure

SOP Title: Use and Maintenance of an Analytical & Precision Balance

Document ID: 26012

Version

3.0

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Supersedes

2.0

Effective Date: 17Sep21

Written by:

Printed Name:

Title:

Signature/Date:

Approved by:

Printed Name:

Title:

Signature/Date:

QA Approved by:

Printed Name:

Title:

Signature/Date:

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1. PURPOSE

- 1.1. The purpose of this procedure is to describe the proper use and handling of an Analytical and Precision Balance.

2. SCOPE

- 2.1. This procedure applies to all Analytical and Precision Balances.

3. REFERENCES

- 3.1. Mettler Toledo Precision and Analytical Balance ML User Manual
3.2. 10007: Non-Routine Equipment Maintenance
3.3. 10009: General Record Review
3.4. HSL_GL_001: Waste Disposal at the Advanced Technology Research Facility

4. RESPONSIBILITIES

- 4.1. The Research Associate, hereafter referred to as Analyst, is responsible for reviewing and following this procedure, and documenting performance of equipment maintenance.
4.2. The Scientific Manager or designee is responsible for training personnel in this procedure and reviewing associated documentation.
4.3. The Quality Assurance Specialist is responsible for quality oversight and approval of this procedure.
4.4. Trained personnel perform equipment maintenance record review per "10009: General Record Review."

5. DEFINITIONS

- 5.1. As Needed Maintenance – maintenance that is performed outside of routine maintenance but is not performed in response to equipment malfunction.
5.2. Non-Routine Maintenance – maintenance that is performed in response to equipment malfunction or failure.
5.3. Routine Maintenance – maintenance that is performed at planned intervals to identify and prevent problems before they result in equipment failure.

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6. REAGENTS, CHEMICALS, AND EQUIPMENT

- 6.1. Balance, Analytical, Mettler Toledo
- 6.2. Balance, Precision, Mettler Toledo
- 6.3. Cleaning Brush (Forney, Cat # 70508 or equivalent)
- 6.4. Primary Disinfectant (Cavicide, FNLCR Warehouse, Cat # 79300360 or equivalent)
- 6.5. Secondary Disinfectant (Ster-ahol, VWR, Cat # 14003-358 or equivalent)
- 6.6. Wipe, Low-Lint, Wypalls (FNLCR Warehouse, Cat # 79300335 or equivalent)
- 6.7. Weigh Boats (VWR, Cat # 89106-768 or equivalent)
- 6.8. Weigh Paper (VWR, Cat # 12578-121 or equivalent)
- 6.9. Spatula (VWR, Cat # 13197-378 or equivalent)

7. HEALTH AND SAFETY CONSIDERATIONS

- 7.1. Proper safety precautions should be taken while working in a laboratory setting. This includes, but is not limited to, proper protective equipment such as lab coats, safety glasses, closed-toe shoes, and non-latex gloves.
- 7.2. Refer to the respective Safety Data Sheet (SDS) when working with any chemicals.
- 7.3. Refer to "HSL_GL_001: Waste Disposal at the Advanced Technology Research Facility," "EHS-WM-1: Disposal and Minimization of Chemical Waste," and "EHS-WM-2: Biological Waste Handling and Disposal" for waste disposal processes.

8. PROCEDURE PRINCIPLES

- 8.1. Calibration checks performed on a balance must be captured on the associated data capture form. Use "26012-01: Precision Balance Maintenance Form" for the precision balance and "26012-02: Analytical Balance Maintenance Form" for the analytical balance.
- 8.2. Only handle weights using forceps or special gloves that come with calibration set. Never touch the weight with your bare hands.
- 8.3. Only use the balances indoors in dry locations. Avoid direct sunlight, air drafts, temperature fluctuations, and vibrations.

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- 8.4. Do not use pointed objects to operate the touch screen.
- 8.5. Only plug the balance AC/DC adapter into a grounded socket. Balance must be warmed up for at least 30 minutes after connecting to the power supply in order to obtain accurate weighing results; balance is ready for use when switched on from standby.
- 8.6. If balance has draft shields encircling the weighing pan, ensure all of them are closed before using final sample measurement readout.
- 8.7. The  key can be used at any time to toggle between weight unit.
- 8.7.1. Example: mg to g

9. EQUIPMENT USE

9.1. Levelling a Balance

- 9.1.1. Balances need to be level prior to use if a leveling feature is available.
- 9.1.2. The balances have a level indicator and two adjustable leveling feet to compensate for slight irregularities in the surface of the weighing bench. The balance is horizontal when the air bubble is in the middle of the level glass. (See Attachment 1)
- 9.1.3. Adjust the two leveling feet appropriately until the air bubble comes to rest in the middle of the glass. Use the "Leveling Assistant" option under "Menu" to assist with manually adjusting the balance prior to calibration. (See Attachment 1)
- 9.1.4. If a balance is leveled at any time, it must be calibrated prior to next measurement.
- 9.1.5. Annotate that balance was leveled on Form "26012-01" or "26012-02" as appropriate.

9.2. Calibration Check

Note: Calibration check must be performed prior to use on the day of use or following leveling (See 9.1).

- 9.2.1. Verify the balance is level. If the balance is not level, perform section 9.1.
- 9.2.2. Press **«On**. The balance is ready for weighing or for operation with the last active application. Approved balances will execute an initial zero.

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9.2.3. Press «→0/T←» to zero the balance.

9.2.4. Print zero reading.

9.2.5. Place the first calibration check weight on the weighing pan.

Note: For the Analytical Balance use 200 mg, 5 g, and 100 g weights. For the Precision Balance use 20 g and 500 g weights.

9.2.6. Wait until the instability detector "O" disappears and the stability beep sounds.

9.2.7. Print the calibration result.

9.2.8. Repeat steps 9.2.4 to 9.2.8 for all calibration check weights for the appropriate balance being used.

9.2.9. Attach balance printout to the form. Record result or affix print out. Record Notebook/Logbook data reference per HSL_QS_017 on printout if applicable. Record file name (ex. "Nucleic Acid YYYY MM DD v3.8.ndj") in Notebook/Logbook if applicable.

9.2.10. Verify calibration check is passing. See Table 1 for acceptable calibration weight ranges.

Table 1: Calibration Check Weight Ranges

Actual Weight Applied	Acceptable Weight Range
200 mg	180 mg – 220 mg
5 g	4.5 g – 5.5 g
20 g	18 g – 22 g
100 g	90 g – 110 g
500 g	450 g – 550 g

9.2.11. If calibration check measurement is outside the acceptable weight range (Table 1), turn off unit and unplug. Clean the weighing pan, draft shield, bottom plate, and housing of the balance with Cavicide then wipe with a clean low-lint wipe. Allow balance to dry completely, turn the instrument on then repeat steps 9.2.1 to 9.2.11.

9.2.12. If the calibration check fails again, immediately stop using the instrument and contact the Scientific Manager or designee.

9.2.13. If calibration check passes, proceed to section 9.3 to perform a sample weighing.

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9.3. Weighing a Sample

9.3.1. The balance is ready for weighing or for operation with the last active application. Approved balances will execute an initial zero.

9.3.2. Place the appropriate weigh boat/paper on the weighing pan and Press «→0/T←» to zero the balance. "0.00 g" and "Net" appears in the display. Print zero reading.

9.3.3. Place weighing sample on weighing boat/paper using a spatula as needed. Close draft shields if available.

9.3.4. Wait until the instability detector "O" disappears and the stability beep sounds.

9.3.5. Print the result and attach to record. Record result or affix print out. Record Notebook/Logbook data reference per HSL_QS_017 on printout if applicable. Record file name (ex. "Nucleic Acid YYYY MM DD v3.8.ndj") in Notebook/Logbook if applicable

10. MAINTENANCE

10.1. As Needed Maintenance

10.1.1. Spills

10.1.1.1. Turn off unit and unplug.

10.1.1.2. Clean the weighing pan, draft shield, bottom plate, and housing of the balance with Cavicide then wipe with a clean low-lint wipe. Allow balance to dry completely, turn the instrument on.

10.1.2. Document as needed maintenance in its respective section on form 26012-01 or 26012-02.

10.2. Annual Calibration

10.2.1. Balance weights receive annual calibration and maintenance by a contracted vendor, based on the manufacturer's recommendations.

10.2.2. Print calibration report and file.

10.3. Biennial Calibration

10.3.1. Analytical and Precision Balances are calibrated by a contracted vendor, based on the manufacturer's recommendations.

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10.3.2. Print calibration report and file.

10.4. Non-Routine Maintenance

10.4.1. In the case that the Analytical or Precision Balance is not operating correctly, transition processes being performed to another unit (when applicable), post a sign stating the equipment is out of service and initiate non-routine maintenance documentation per "10007: Non-Routine Equipment Maintenance."

10.4.2. Document the nature of any failures or malfunctions, how and when it was discovered, and the personnel involved on "10007-01: Non-Routine Equipment Maintenance Form."

10.4.3. Initiate a service request and complete the non-routine maintenance process following 10007.

11. ATTACHMENTS

11.1. Attachment 1: Levelling the Balance

11.2. Attachment 2: 26012-01_Precision Balance Use and Maintenance Form

11.3. Attachment 3: 26012-02_Analytical Balance Use and Maintenance Form

12. REVISION HISTORY

Revision Start Date	Version #	Changes	Reasons
16Mar17	New	Create new SOP for use and maintenance of analytical and precision balance	Currently no SOP
30Dec19	2.0	1. Update nomenclature language of References 2. added additional guidance and images for use from the User Manuals 3. Maintenance updated to include: As Needed, Non-Routine 4. Forms changed for daily use	1. Reflects new nomenclature 2. Clarity for protocol and weight ranges for scales and weight sets, and ease of use 3. GDP compliance, new form creation, and clarity 4. Reflects new practices

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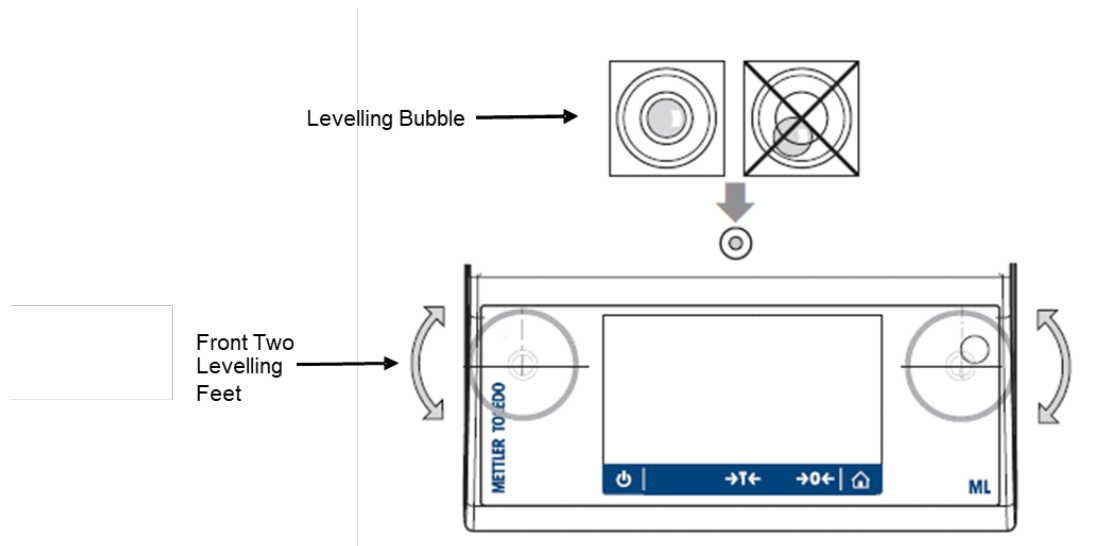
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Attachment 1: Levelling the Balance



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Attachment 2: Analytical Balance Maintenance form

Frederick National Laboratory for Cancer Research <small>sponsored by the National Cancer Institute</small>		Vaccine, Immunity and Cancer Directorate Standard Operating Procedure Form	
Form Title: Analytical Balance Maintenance Form			
Document ID: 26012	Version:	2.0	
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Equipment ID:		Equipment Due Date:		Weight Set ID:		Weight Set Due Date:	
Date	Initials	Print Out/ Results				Comments	
		<input type="checkbox"/> N/A				<input type="checkbox"/> Pass <input type="checkbox"/> Fail and Cavicide Lot #: <hr/> Second Reading <input type="checkbox"/> Pass <input type="checkbox"/> Fail	
		<input type="checkbox"/> N/A				<input type="checkbox"/> Pass <input type="checkbox"/> Fail and Cavicide Lot #: <hr/> Second Reading <input type="checkbox"/> Pass <input type="checkbox"/> Fail	

Reviewed by/date: _____

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As Needed Maintenance: ☐ N/A

Date	Activity Performed	Recorded by/date	Reviewed by/date
<input type="checkbox"/> N/A			
<input type="checkbox"/> N/A			

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Attachment 3: Precision Balance Maintenance form

Frederick National Laboratory for Cancer Research <small>sponsored by the National Cancer Institute</small>		HPV Serology Laboratory Standard Operating Procedure Form	
Form Title: Precision Balance Maintenance Form			
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Equipment ID:		Equipment Due Date:		Weight Set ID:		Weight Set Due Date:	
Date	Initials	Print Out/ Results				Comments	
		<input type="checkbox"/> N/A				<input type="checkbox"/> Pass <input type="checkbox"/> Fail and Cavicide Lot #: <hr/> Second Reading <input type="checkbox"/> Pass <input type="checkbox"/> Fail	
		<input type="checkbox"/> N/A				<input type="checkbox"/> Pass <input type="checkbox"/> Fail and Cavicide Lot #: <hr/> Second Reading <input type="checkbox"/> Pass <input type="checkbox"/> Fail	

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**HPV Serology Laboratory
Standard Operating Procedure
Form**

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As Needed Maintenance: ☐ N/A

Date	Activity Performed	Recorded by/date	Reviewed by/date
<input type="checkbox"/> N/A			
<input type="checkbox"/> N/A			

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