SOP Number	EQ-03-10
Title	Calibration and Maintenance of Weigh Balances
Revisions Made	• Minor editorial changes for clarification purposes.

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Title	Calibration and Maintenance of Weigh Balances
Scope	Describes the process for use, calibration, and quality contro l of weigh balances and reference weights.
Application	Weigh balances are used to measure the weight of objects in the laboratory, such as media and reagent ingredients and disinfectant containers. Reference weights are used as reference standards to verify the calibration of the weigh balances.

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1. Definitions	1. ISO = International Organization for Standardization 2. A2LA = American Association for Laboratory Accreditation 3. NVLAP = National Voluntary Laboratory Accreditation Program 4. Vendor calibration = calibration by an ISO 17025 accredited vendor 5. Tolerance for weigh balances = Acceptable limits or range in measurement (in grams) that the laboratory can tolerate. See 12.4.
2. Health and Safety	None
3. Personnel Qualifications and Training	Refer to SOP ADM-04, OPP Microbiology Laboratory Training.
4. Instrument Calibration	1. Weigh balances are inspected, cleaned, and calibrated annually by an ISO 17025 accredited vendor. 2. Perform accuracy check of weigh balances once per year, approximately six months after vendor calibration. 3. Calibration of the reference weights is performed every two years by an ISO 17025 accredited vendor. Weights may be calibrated more frequently if deemed necessary (e.g., weight is dropped, chipped, etc.). 4. Calibration certificates/reports for weigh balances and reference weights must contain the stamp of the accrediting body (e.g., A2LA, NVLAP) and the vendor's certificate number.
5. Sample Handling and Storage	1. Wear clean cotton gloves (supplied with reference weights) or use forceps while handling reference weights. To avoid depositing oil and dirt onto the surface of the weight, do not touch weights with bare hands. 2. Store reference weights in cases provided by the manufacturer.
6. Quality Control	For quality control purposes, the required information is documented on the appropriate form(s) (see section 14).
7. Interferences	1. For optimal performance, place balance on a stable, even, horizontal surface with minimal vibration. Avoid areas with excessive heat and moisture, direct sunlight, aggressive chemical vapors, and drafts. 2. If a balance is transferred to a different location, perform the accuracy check (section 12.3) prior to use in the new location.
8. Non-conforming Data	1. When verifying the calibration of weigh balances (section 12.3), confirm any discrepancies in weight measurements by repeating the operation. Notify a service representative, if necessary, to re-calibrate the instrument

	when the calibration check shows that the weigh balance is outside of the acceptable tolerance range (see section 12.4). 2. Replace the equipment if the vendor determines that a weigh balance or reference weight is out of tolerance and cannot be properly calibrated. 3. Procedures to handle non-conformances are consistent with SOP ADM-07, Non-Conformance Reports.
9. Data Management	1. Electronically maintain an inventory of weigh balances and reference weights requiring vendor calibration (see section 14). After each addition to or deletion from the inventory, file a hard copy of the inventory in the Weigh Balance Calibration Record book. 2. Archive data consistent with SOP ADM-03, Records and Archives.
10. Cautions	1. Remove reference weights from service when the calibration expires (two years from the date of calibration). Return weights to service when recalibration is completed. 2. Perform annual calibration of weigh balances at approximately the same time each year. 3. See section 5 for guidance on proper handling of reference weights.
11. Special Apparatus and Materials	1. *Weigh balances*. Used to measure the weight of objects in the laboratory, such as media and reagent ingredients and disinfectant containers. 2. *Reference weight set* (range of 1 g to 50 g) and *Individual reference weights* (1 mg, 10 mg, 100 mg, 100 g, 500 g, 1 kg, 2 kg). Used as reference standards to verify the calibration of the weigh balances.
12. Procedure and Analysis	
12.1 Calibration of Weights	a. When the calibration of a weight or weigh set expires (two years from the date of calibration), remove it from service. b. Consult ISO 17025 accredited vendor regarding quote for service and any transportation instructions, if applicable. c. Transport weights to vendor, if applicable. d. Once the weight or weight set has been recalibrated, file the calibration certificate electronically and, if applicable, in the Weigh Balance Calibration Record book. Return the weights to service.
12.2 Daily Calibration and Use of Weigh	a. Follow the instructions provided by the manufacturer for the operation of each weigh balance. See section 15. b. Each balance has a built-in calibration system.

Balances

c. When weighing, apply load to center of balance. Close balance doors, if applicable, to reduce draft.

d. Clean balance pan after each use with a soft brush or damp towel. Allow the balance to dry before the next use.

12.3 Six Month Accuracy Check of Weigh Balances

a. Perform accuracy check of weigh balances once a year, approximately six months after vendor calibration, using reference weights.

b. See the Reference Weight Selection for Sixth Month Accuracy Check (section 14) for guidance on which reference weights to use to verify the calibration of each weigh balance.

c. See section 5 for guidance on handling reference weights.

d. Tare or "zero" the weigh balance before the addition of each weight.

e. Add weights to center of balance and close balance doors, if applicable.

f. Record results for each reference weight on the Verification of Weigh Balance Calibration Record Form (section 14).

g. See section 12.4 for acceptable tolerances for weigh balances when conducting the accuracy check.

h. Note that the acceptable tolerance varies for the 10 and 100 mg reference weights, depending upon whether they are being weighed on a top loading balance that reads to 0.01 g or a more sensitive analytical balance.

12.4 Six Month Accuracy Check of Weigh Balances – Acceptable Tolerances

Total Load Applied to Weigh Balance	Acceptable Tolerance	Acceptable Range of Weigh Balance Readings
1 mg	± 0.00005 g	0.00095 g to 0.00105 g
10 mg[A]	± 0.0005 g	0.0095 g to 0.0105 g
10 mg[B]	None[B]	0.01 g
100 mg[A]	± 0.005 g	0.095 g to 0.105 g
100 mg[B]	± 0.01 g	0.09 g to 0.11 g
1 g	± 0.01 g	0.99 g to 1.01 g
2 g	± 0.01 g	1.99 g to 2.01 g
5 g	± 0.01 g	4.99 g to 5.01 g
10 g	± 0.01 g	9.99 g to 10.01 g

20 g	± 0.01 g	19.99 g to 20.01 g
50 g	± 0.01 g	49.99 g to 50.01 g
100 g	± 0.1 g	99.9 g to 100.1 g
150 g	± 0.1 g	149.9 g to 150.1 g
500 g	± 0.1 g	499.9 g to 500.1 g
1 kg	± 1.0 g	999 g to 1001 g
2 kg	± 1.0 g	1999 g to 2001 g
3 kg[C]	± 1.0 g	2999 g to 3001 g
4 kg[C]	± 1.0 g	3999 g to 4001 g
5 kg[C]	± 1.0 g	4999 g to 5001 g

[A]When weighed on an analytical balance.

[B]When weighed on a top loading balance that reads to 0.01g.

[C]Use combination of 1 kg and 2 kg weights to achieve the total load required. See Inventory of Weigh Balances and Reference Weights Requiring Vendor Calibration (section 14).

12.5 Annual Calibration of Weigh Balances	a. Contact ISO 17025 accredited vendor and schedule a date for calibration. b. Weigh balances are not shipped out. The vendor inspects, cleans, and calibrates balances on site. c. File the calibration certificate electronically and, if applicable, in the Weigh Balance Calibration Record book.
13. Data Analysis/ Calculations	None
14. Forms and Data Sheets	Forms are stored separately from the SOP under the following file names: Sample Inventory of Weigh Balances and Reference Weights Requiring Vendor Calibration — EQ-03-10_F1.docx Reference Weight Selection for Six Month Accuracy Check — EQ-03-10_F2.docx Verification of Weigh Balance Calibration Record Form — EQ-03-10_F3.docx
15. References	Operation manuals for weigh balances are located in file cabinet in D-wing.