

## Section Five

### Quality Assurance

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#### 5.2 Balance Calibration and Intermediate Checks

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##### 5.2.1 BACKGROUND

Refer to manufacturer's manual for balance specific procedures.

##### 5.2.2 SCOPE

The procedure is to ensure accuracy of measurement when an analytical or top-loading balance is used to prepare solutions or reference material for application to toxicology methods.

##### 5.2.3 EQUIPMENT

5.2.1.3.1 ANSI/ASTM Type I, Class 1 or Class 2 laboratory weights

5.2.1.3.2 Analytical and/or Top-Loading, Direct-Reading Laboratory Balances

##### 5.2.4 QUALITY ASSURANCE REQUIREMENTS

5.2.4.1 All balances will be calibrated and serviced yearly by a qualified vendor.

5.2.4.2 Weights used for intermediate checks of calibration will be calibrated yearly by a qualified vendor.

5.2.4.3 An in-house, intermediate check of balances in use will be performed within 45 days prior to use. Results are to be recorded in logbook.

5.2.4.4 The weights used for the intermediate check should depend on the application of the balance. Three weights must be used to represent the weight range in question. For instance, if the balance is being used to prepare buffer solutions, then perhaps 100g, 500g and 1000g weights would characterize the weight range. If the balance is used to prepare mg/mL reference material then 1mg, 10mg and 100mg weights may be appropriate.

5.2.4.5 The type of balance employed should be a consideration. For weights less than 100mg, an analytical balance should be used. For the preparation of a solution involving gram quantities, a top-loading balance should be used.

5.2.4.6 Do not touch weights with bare hands. Weights should be transferred with forceps or gloves. The weights will be stored and transported in their case.

**5.2.5 GENERAL PROCEDURES**

- 5.2.5.1 Inspect balance pan, clean if necessary.
- 5.2.5.2 Inspect level bubble, level if necessary.
- 5.2.5.3 Tare balance with weighing paper or weigh boat.
- 5.2.5.4 Place weight on balance.
- 5.2.5.5 If appropriate, add or subtract correction factor for weight as determined by yearly weight calibration certificates. The correction factor must be applied when it changes whether or not the tolerance is in the accepted range.
- 5.2.5.6 Record weight on balance logsheet.
- 5.2.5.7 The acceptable range for the balance is based on whether an analytical or top-loading balance is used.

5.2.5.7.1 Analytical Balance

| <b>Weight</b>   | <b>Tolerance</b>   | <b>Acceptable Range</b> |
|-----------------|--------------------|-------------------------|
| 100mg<br>(0.1g) | ±1.0mg<br>(0.001g) | 99.0mg - 101.0g         |
| 100g            | ±0.1g              | 99.9g - 100.1g          |

5.2.5.7.2 Top-loading Balance

| <b>Weight</b> | <b>Tolerance</b> | <b>Acceptable Range</b> |
|---------------|------------------|-------------------------|
| 10.00g        | ±0.02g           | 9.98g - 10.02g          |
| 100.00g       | ±0.2g            | 99.8g - 100.2g          |
| 500g          | ±0.5g            | 499.5g - 500.5g         |
| 1000g         | ±1.0g            | 999.0g - 1001.0g        |

- 5.2.5.8 The verification procedure should be repeated if the value does not fall within the acceptable range. If value is still out of range, contact service vendor to set up a service call. A note must be placed on the balance to indicate that it is not in range and must not be used.

**5.2.6 REFERENCES**

- 5.2.6.1 ASTM Method E-617-97, **Standard Specification for Laboratory Weights and Precision Mass Standards.**

## *Revision History*

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#### **5.2 Balance Calibration and Intermediate Checks**

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| <b>Revision #</b> | <b>Issue Date</b> | <b>History</b>   |
|-------------------|-------------------|--|
| 1                 | 09-18-01          | Original Issue   |
| 2                 | 05-07-2007        | Updated QA measures and reformatting based on current requirements.  |
| 3                 | 1-16-2013         | Amended timeframe for intermediate checks, added storage and transport conditions for weights. Clarified when correction factors needed to be applied. |
| 4                 | 04/22/2015        | Minor formatting changes.  |

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