

EQUIPMENT MAINTENANCE**23.1 PURPOSE**

To insure that equipment in the Forensic Biology Unit is working properly.

23.2 RESPONSIBILITY

Forensic Science Examiners in the Forensic Biology Unit. Ordering information is maintained in a log book in the Forensic Biology Unit. For additional information, refer to the Equipment Inventory in Appendix 2.

23.3 DEFINITIONS

NIST: National Institute of Standards and Technology

23.4 PROCEDURE**23.4.1: General Information**

- A. New equipment will be performance checked before use and recorded on the appropriate equipment log sheet (newly generated if needed). A memo will be generated by the Lead of the Forensic Biology Unit, or designee, stating that it is acceptable for use and its effective date.
- B. New equipment for a new method will be validated along with the new method. (see FB SOP-25 Validation of New Serological Tests).
- C. Laboratory Equipment will be cleaned as needed with the appropriate disinfecting solution described in FB SOP-21 (General Chemical and Reagent QC) and according to FB SOP-01 (Physical Evidence Examination).

23.4.2: Ovens

- A. Check the temperatures of the ovens weekly using the thermometer placed within each.
- B. The temperature range should be 35°C - 39°C.
- C. The temperature, date and initials are recorded on the appropriate Oven Equipment Log Sheet.
- D. If the temperature deviates from this range, adjust the temperature according to the manufacturer's instructions as needed and record on the appropriate Oven Equipment Log Sheet.
- E. If the temperature continues to deviate from this range, remove from service until the problem is corrected and record on the appropriate Oven Equipment Log Sheet.

- F. If the temperature is adjusted for a different use, check with a NIST traceable thermometer before and after use.

23.4.3: Refrigerators and Freezers

- A. Check the temperatures of the refrigerators and freezers weekly. Units used infrequently and not for evidence or critical reagent storage will be checked before each use but not less than once per month.
- B. The refrigerator temperature must be maintained above freezing and no higher than 7°C.
- C. The freezer temperature must be maintained no higher than -10°C.
- D. The temperature, date and initials are recorded on the appropriate Refrigerator or Freezer Equipment Log Sheet.
- E. If the temperature deviates from either of these ranges, adjust the temperature according to the manufacturer's instructions as needed and record on the appropriate Refrigerator or Freezer Equipment Log Sheet.
- F. If the temperature continues to deviate from these ranges, remove from service until the problem is corrected and record on the appropriate Refrigerator or Freezer Equipment Log Sheet.
- G. The upright freezer located in room 1-186 of the main Forensic Biology Lab will be considered an extension of the walk-in-freezer since they are both located in the same room. Therefore, no separate LIMS storage is required (i.e. samples stored in this upright freezer will be transferred into "freezer storage" in LIMS).

23.4.4: Thermometers

- A. Check the thermometers from each unit yearly against a NIST traceable thermometer. The temperatures must read within $\pm 2^{\circ}\text{C}$ of the NIST thermometer.
- B. Place the thermometers with the appropriate NIST traceable thermometer as follows:
1. The freezer thermometers into the walk-in freezer.
 2. The refrigerator thermometers into the walk-in refrigerator.
 3. The oven thermometers into one (1) oven.
 4. Leave the thermometers overnight.
- C. The date, initials and results are recorded on the appropriate Thermometer Equipment Log Sheet.

- D. If the temperature deviates from the range, remove the thermometer from service and replace. Record on the appropriate Thermometer Equipment Log Sheet.
- E. For additional information on NIST traceable thermometers see GL-21 (General Laboratory Equipment).

23.4.5: Micropipets

- A. Micropipets are used in Forensic Biology for non-critical measurements.
- B. The micropipets are serviced yearly by an outside vendor and recorded on the equipment and on the appropriate Micropipet Equipment Log Sheet.
- C. If necessary, a performance check may be conducted before use as follows:
 - 1. Weigh the smallest and the largest volumes of dH₂O dispensed with that particular model on the Top Loader balance.
 - 2. Repeat the measurement 10 times for each volume tested and note the total weight according to the appropriate Micropipet Equipment Log Sheet.
 - 3. The date, initials and results are recorded on the appropriate Micropipet Equipment Log Sheet.
- D. If the unit does not meet the following specifications, remove from service and record on the appropriate Micropipet Equipment Log Sheet.
 - 1. 10µl micropipet ± 10% @ 1µl and 10µl
 - 2. 20µl micropipet ± 10% @ 2µl and 20µl
 - 3. 100µl micropipet ± 10% @ 10µl and ± 5% @ 100µl
 - 4. 200µl micropipet ± 10% @ 20µl and ± 5% @ 200µl
 - 5. 1000µl micropipet ± 5% @ 100µl and 1000µl

23.4.6: Alternate Light Sources

- A. Crime-lites
 - 1. Check the known stains (semen, saliva, urine and blood) weekly for fluorescence or stain detection under selected Crime-lite/wavelength. Note: Crime-lite(s) used less often than weekly may be checked before each use.
 - 2. The date, sample, Crime-lite number, initials and result are recorded on the appropriate Crime-Lite Equipment Log Sheet.

3. If the known stains are not fluorescent or visible under these Crime-lites/wavelength(s), remove from service until problem is corrected and record on the appropriate Crime-Lite Equipment Log Sheet.
- B. CrimeScopes (Mini and Hand-held)
1. Check the known stains (semen, saliva and urine) before each use for fluorescence under selected wavelength(s).
 2. The date of check, sample, wavelength, initials and result are recorded on the appropriate CrimeScope Lights Equipment Log Sheet.
 3. If the known stains are not fluorescent or visible under these wavelength(s), remove from service until problem is corrected and record on the appropriate CrimeScope Lights Equipment Log Sheet.

23.4.7: Ultrasonic Bath

- A. Drain, clean bath and replace water quarterly or as often as needed. Fill the tank with dH₂O one (1) inch from the top.
- B. The date and initials are recorded on the Ultrasonic Bath Equipment Log Sheet.
- C. If necessary, dH₂O may be added to the bath before use ensuring the level is approximately one (1) inch from the top of the tank.
- D. If the bath fails to work according to the manufacturer's instructions, remove from service until problem is corrected and record on the Ultrasonic Bath Equipment Log Sheet.

23.4.8: Top Loader Balance

- A. Check the balance quarterly with the appropriate NIST traceable weights at: 80g, 50g, 20g, 10g, 5g and 1g.
- B. The date, initials and results are recorded on the Top Loader Balance Equipment Log Sheet.
- C. If the weight deviates $\pm 2\%$ of the actual weight, remove from service until the problem is corrected and record on the appropriate Equipment Log Sheet.
- D. The Top Loader Balance is serviced yearly by an outside vendor and recorded on the equipment and on the Top Loader Balance Equipment Log Sheet.

23.4.9: Microscopes

The microscopes are serviced yearly by an outside vendor and recorded on the equipment and on the Microscope Equipment Log Sheet.

23.4.10: Hoods

- A. Generally, venting hoods are serviced yearly by an outside vendor and recorded on the equipment.
- B. Replace filters in non-venting hoods as necessary and record on the Hood Filter Replacement Equipment Log Sheet.

23.5 REFERENCES

- A. Boekel Scientific. Boekel Incubator Operating Instructions.
- B. Mettler Toledo. Operating Instructions Line of Balances.
- C. Sears Kenmore. Refrigerator Owner's Guide.
- D. Rainin Instrument CO. INC. Pipetmen Operating Instructions.
- E. Rainin. Pipet-Lite Operating Instructions.
- F. Foster + Freeman. Crime-lite Information Sheets.
- G. Spex Forensics. Mini-CrimeScope Operation Manual v. 2.0.
- H. Fisher Scientific. Operator's Manual Tabletop Ultrasonic Cleaners.
- I. Traulsen. "N-Width" Reach in Refrigerator/Freezer Models/Self-Contained Owner's Manual.
- J. GL-21 (General Laboratory Equipment)