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<p style="text-align: center;">Technical Procedure for Pipettes and Dispenser System</p>			<p>Page #: 1 of 9</p>

1.0 Purpose – This procedure specifies the requirements for use of electronic pipettes and the Hamilton Microlab 600 dispenser system.

2.0 Scope – This procedure applies to all electronic pipettes and the Hamilton Microlab 600 dispenser system used in the Blood Alcohol discipline of the Pitt County Sheriff's Office Forensic Services Unit.

3.0 Definitions

- **Quality Control (QC) Check** - Periodic confirmation of the reliability of equipment.

4.0 Equipment, Materials, and Reagents

4.1 Equipment

- Eppendorf Xplorer 0.2 - 5.0 mL pipette
- Eppendorf Xplorer Plus 15 – 300 µL pipette
- Eppendorf Xplorer Plus 50 – 1000 µL pipette
- Hamilton Microlab 600 Dispenser
- Mettler Toledo XS204 analytical balance
- Mettler Toledo LC-P45 Printer


4.2 Materials and Reagents

- Type I water
- 0.015 g/100 mL n-Propanol Internal Standard (used with Hamilton dispenser)
- Beakers
- Reference standard weights
- Pipette tips

5.0 Pipettes

5.1 New Pipettes

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5.1.1 All manufacturer certificates, manuals, and other documents will be stored electronically in the county Document Management System (DM) and a paper copy filed (if applicable).

5.1.2 A new tab shall be created in the [BAC Equipment Maintenance Log](#) in DM for each new pipette.

5.1.3 The pipette shall be calibrated by an external vendor.

5.1.3.1 The Certificate of Calibration shall be stored electronically in DM and a paper copy filed (if applicable).

5.1.3.2 The calibration information shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.

5.1.4 A QC Check shall be performed prior to use ([Section 5.4](#))

5.2 Maintenance

5.2.1 Maintenance shall be performed in accordance with the appropriate manual.

5.2.2 Any maintenance shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.


5.2.3 After any maintenance, other than external cleaning, a QC check shall be performed ([Section 5.4](#)) prior to resuming use.

5.3 Calibration

5.3.1 All pipettes shall be calibrated on a yearly basis by an approved external vendor.

5.3.1.1 Certificates of Calibration shall be stored electronically in DM and a paper copy filed (if applicable).

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5.3.1.2 The calibration information shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.

5.4 Quality Control (QC) Check

5.4.1 Each month, the calibration of the pipettes shall be checked gravimetrically using a calibrated balance and Type I water. The results shall be recorded electronically in the [Pipette QC Checks](#) workbook in DM, and the printed results shall be taped in the **QC Checks** binder found in the BAC lab.

5.4.2 Each pipette shall be checked at the testing volumes that are closest to the volume dispensed for each pipette; the values immediately higher and lower than the volume used in testing. These volumes are obtained from the Technical Data table in the manual.

5.4.2.1 Specify the Pipette being used on the printer. This step can be skipped if it is the second set of statistics for the same pipette; the printer will display the last ID information entered.

5.4.2.1.1 Press: Def (7) → ID (4) → (enter S/N) → ↑

5.4.2.2 Enter the Statistics mode on the printer, if not already in mode.


5.4.2.2.1 Press: Def (7) → F (1) → 2 → ↑

5.4.2.3 Place a beaker on the balance and tare.

5.4.2.4 Attach a new pipette tip to the pipette, draw the appropriate volume of sample, dispense into the beaker on the tared balance, and then discard the used pipette tip.

5.4.2.5 Press the F (1) key on the printer to record the weight. After the weight has been printed, tare the balance again.

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5.4.2.6 Repeat steps 5.4.2.4 & 5.4.2.5 nine (9) more times for ten (10) total weights.

5.4.2.7 Press the Clear (←) button on the printer to generate the statistics for the series.

5.4.3 The pipette has passed the QC Check if the Relative Standard Deviation (S_{rel}) is within the allowed % Random Error per the Technical Data table in the manual for that pipette. The [Pipette QC Checks](#) workbook in DM performs the same statistics calculations as the balance printers to confirm the results.

5.4.3.1 If a pipette does not pass the QC Check, repeat 5.4.2 for the volume that did not pass. If the pipette does not pass a second time, it will be taken out of service and appropriate maintenance performed.

5.5 Use on Evidence

5.5.1 Pour an adequate amount of sample into a 10 mL beaker to reduce the risk of cross contamination on the original sample.

5.5.2 Set to appropriate volume.

5.5.3 Firmly attach pipette tip.


5.5.4 Immerse pipette tip into the sample poured into the beaker and press the appropriate button to aspirate the set volume.

5.5.5 Remove the pipette tip from the sample and place into the headspace vial.

5.5.6 Press the appropriate button to dispense the sample into the headspace vial.

5.5.7 Perform the “blow” function on the pipette to ensure all sample has been

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expelled from the pipette tip.

- 5.5.8** Remove the pipette tip from the headspace vial and eject the used pipette tip into the appropriate waste container.

6.0 Hamilton Microlab 600 Dispenser System


6.1 New Dispenser Systems

- 6.1.1** All manufacturer certificates, manuals, and other documents will be stored electronically in DM and a paper copy filed (if applicable).
- 6.1.2** A new tab shall be created in the [BAC Equipment Maintenance Log](#) in DM for each new dispenser system.
- 6.1.3** The dispenser system shall be calibrated by an external vendor.
- 6.1.3.1** The Certificate of Calibration shall be stored electronically in DM and a paper copy filed (if applicable).
- 6.1.3.2** The calibration information shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.
- 6.1.4** A QC Check shall be performed prior to use ([Section 6.4](#))

6.2 Maintenance

- 6.2.1** Maintenance shall be performed in accordance with the appropriate manual.
- 6.2.2** Any maintenance shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.
- 6.2.3** After any maintenance, other than external cleaning, a QC check shall be performed ([Section 6.4](#)) prior to resuming use.

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6.3 Calibration

6.3.1 All dispenser systems shall be calibrated on a yearly basis by an approved external vendor.

6.3.1.1 Certificates of Calibration shall be stored electronically in DM and a paper copy filed (if applicable).

6.3.2 The calibration information shall be recorded in the [BAC Equipment Maintenance Log](#) in DM.

6.4 Quality Control (QC) Check

6.4.1 Each month, the calibration of the dispenser system shall be checked gravimetrically using a calibrated balance and internal standard. The results shall be recorded electronically in the [Pipette QC Checks](#) workbook in DM, and the printed results shall be taped in the **QC Checks** binder found in the BAC lab.

6.4.2 The dispenser system shall be checked at the used for testing (1.8 mL).

6.4.2.1 Specify the dispenser system being used on the printer.

6.4.2.1.1 Press: Def (7) → ID (4) → (enter S/N) → ↑

6.4.2.2 Enter the Statistics mode on the printer, if not already in mode.


6.4.2.2.1 Press: Def (7) → F (1) → 2 → ↑

6.4.2.3 Prime the dispenser system then dispense one or two aliquots of internal standard.

6.4.2.4 Place the beaker on the balance and tare.

6.4.2.5 Dispense an aliquot of internal standard and place the beaker on

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the balance.

6.4.2.6 Press the F (1) key on the printer to record the weight. After the weight has been printed, tare the balance again.

6.4.2.7 Repeat steps 5.4.2.4 & 5.4.2.5 nine (9) more times for ten (10) total weights.

6.4.2.8 Press the Clear (←) button on the printer to generate the statistics for the series.

6.4.3 The dispenser system has passed the QC Check if the Relative Standard Deviation (S_{rel}) is within the allowed % Random Error per the Technical Data table in the manual. The [Pipette QC Checks](#) workbook in DM performs the same statistics calculations as the balance printer to confirm the results.

6.4.4 If the dispenser system does not pass the QC Check, repeat 5.4.2. If the dispenser system does not pass a second time, it will be taken out of service and appropriate maintenance performed.

6.5 Use on Evidence

6.5.1 Turn on the dispenser system then prime the system. Make sure there are no bubbles in the tubes or the syringe(s).


6.5.1.1 If bubbles are present, continue to run the prime until all bubbles are gone. If necessary, perform other maintenance.

6.5.2 From the screen, select Wizards, then Aliquot.

6.5.2.1 Make sure the volume is set at 1.8 mL and the auto refill is on.

6.5.2.2 Dispense one or two aliquots.

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6.5.3 Place the headspace vial under the dispensing tool and dispense an aliquot into the vial.

7.0 Limitations – N/A

8.0 Safety

8.1 Use care when handling glass beakers.

9.0 References

Eppendorf Xplorer/Xplorer plus Operating Manual

Mettler Toledo LC-P45 Printer Operating Instructions


Hamilton Microlab 600 manuals

10.0 Records

- QC Check binder
- [Pipette QC Checks](#) excel workbook in DM
- [BAC Equipment Maintenance Log](#) excel workbook in DM
- Original Equipment Certificates
- Annual Calibration Certificates

11.0 Attachments – N/A

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REVISION HISTORY		
CURRENT VERSION	EFFECTIVE DATE	SUMMARY OF CHANGES
1	2018/02/19	Original Version
2	2018/04/01	New version for ISO accreditation application. Inserted hyperlinks.
3	2018/09/19	Section 4.2 - Corrected concentration of Internal Standard.. 5.1.1 – Defined DM as Document Management System. 5.1.1, 5.1.3.1, 5.3.1.1, 6.1.1, 6.1.3.1, & 6.3.1.1- Added “(if applicable)” to filing paper copies. 5.4.2.2.1 & 6.4.2.2.1 – Corrected “ID (4)” to “F (1)”. 5.5.8 – Clarified the pipette tip was to be removed from the headspace vial. 6.3.1 – Corrected “pipettes” to “dispenser systems”.

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