
Liquid Handling Systems

1.0 Purpose - This procedure specifies the required elements for the maintenance and use of the Hamilton-Microlab 1000 Plus and the Microlab 500 Liquid Handling Systems.

2.0 Scope – This procedure applies to the Liquid Handling Systems used to prepare liquids for analysis by Headspace Gas Chromatography in the Toxicology Units of the State Crime Laboratory.

3.0 Definitions – N/A

4.0 Equipment, Materials and Reagents

4.1 Equipment

- Hamilton Microlab 1000 Plus or Microlab 500 liquid handling system

4.2 Materials

- Headspace sample vials
- Magnetic seals
- Hand crimper
- Liquid waste container (suggested 250 mL beaker)
- Kimwipes or equivalent
- Reservoir for the diluent solution

4.3 Reagents

- 10 % bleach solution

5.0 Procedure

5.1 Standards and Controls

5.1.1 The system is verified by the use of positive and negative controls with an internal standard each time the system is utilized. Refer to the Toxicology Unit [Headspace Gas Chromatography to Quantitate and Identify Volatiles in Liquids](#) procedure.

5.2 Calibrations

5.2.1 The liquid handling systems shall be calibrated annually by a vendor or contractor and the certificate of calibration maintained by the Blood Alcohol Key Operator.

5.2.2 The calibration shall be recorded in the instrument log by the Blood Alcohol Key Operator or designee.

5.3 Maintenance

5.3.1 The Blood Alcohol Key Operator or designee shall flush the tubing with a 10 % bleach solution, or equivalent, once every three months to remove protein build-up and prevent bacterial growth in the tubing.

5.3.2 All maintenance shall be recorded in the instrument log by the Blood Alcohol Key Operator or designee.

5.4 Instrument Set Up - For use with the Toxicology Unit [Headspace Gas Chromatography to Quantitate and Identify Volatiles in Liquids](#) procedure.

5.4.1 Hamilton Microlab 1000 Plus

5.4.1.1 Start up

5.4.1.1.1 Turn power on with switch located on the back of the unit at the bottom right.

5.4.1.1.2 Selections on the display screen may be entered by pressing the "ENT/JA/YES" key.

5.4.1.1.3 Different selections may be displayed or highlighted by pressing the "NEIN/NO" key.

5.4.1.1.4 Values may be entered via the numeric keyboard.

5.4.1.2 Program - If program has been entered, skip this step.

5.4.1.2.1 Select the entries which are in bold face type

5.4.1.2.2 Method? - **{enter method #}**

5.4.1.2.3 *Function: - **Dil**
- **Diluter**

5.4.1.2.4 *Vol:

5.4.1.2.5 Air gap? - **10 uL**

5.4.1.2.6 Asp Automatic Air? – **yes**

5.4.1.2.7 Sample Vol? - **200 uL**

5.4.1.2.8 Diluent? – **uL**

5.4.1.2.9 Diluent? - **1800 uL**

5.4.1.2.10 Wash Vol? - **0 uL**

5.4.1.2.11 Wash Step? – **1**

5.4.1.2.12 *Syr:

5.4.1.2.13 A - Syringe AD **2.5 mL**

5.4.1.2.14 B - Syringe DAD **250 uL**

5.4.1.2.15 Standard tubing – **yes**

5.4.1.2.16 *Speed: (suggested values)

- Asp sample **2** sec.
- Disp sample **2** sec.
- Asp diluent **4** sec.
- Disp diluent **3** sec.

5.4.1.3 Running the method

5.4.1.3.1 Select and enter "RUN."

5.4.1.3.2 Choose method containing program.

5.4.1.3.3 Press enter to "zero" the syringes.

5.4.1.3.4 Place the diluent tubing on the left of the Microlab 1000 plus into the diluent solution.

5.4.1.3.5 Prime the system by pressing the "ENT" key at the "PRIME?" prompt. The system shall be primed five times before use to clear the tubing of air and any residue. Once priming is done, press the "NO" key to continue.

5.4.2 Hamilton Microlab 500

5.4.2.1 Start up

5.4.2.1.1 Turn power on with switch located on the front of the unit at the bottom right.

5.4.2.1.2 Selections on the display screen may be entered by pressing the "Run/Stop" key.

5.4.2.1.3 The arrow keys may be used to move from one data entry field to another.

5.4.2.1.4 Values may be entered via the numeric keypad.

5.4.2.2 Program - If program has been entered, skip this step

5.4.2.2.1 Select the entries in bold face type:

5.4.2.2.2 Main Menu
Create a new Method or Edit an existing Method
Select
{Select Method Name}
Select

5.4.2.2.3 Method Title

5.4.2.2.4 Ratio 1: **9.0**

5.4.2.2.5	Dilution	1: 10.0
5.4.2.2.6	Left Diluent Volume (uL):	1800.0
5.4.2.2.7	Right Air gap volume (uL):	10.0
5.4.2.2.8	Right Sample volume (uL):	200.0
5.4.2.2.9	Final Volume (uL):	2000.0
5.4.2.2.10	ACCEPT when complete	
5.4.2.2.11	Syringe Fill speed:	Left – 3
5.4.2.2.12	Syringe Aspirate speed:	Right – 1
5.4.2.2.13	Syringe dispense speed:	Left - 3 Right – 2
5.4.2.2.14	Syringe Fill mode:	AUTO
5.4.2.2.15	Air gap mode:	AUTO
5.4.2.2.16	Air gap delay:	0.0
5.4.2.2.17	ACCEPT when complete	
5.4.2.2.18	Wash volume (uL)	0.0
5.4.2.2.19	Left syringe fill speed	4
5.4.2.2.20	Left syringe dispense speed	4
5.4.2.2.21	ACCEPT when complete	
5.4.2.2.22	CONFIRM to Save Method, ESCAPE to Cancel	

5.4.2.3 Running the Method

- 5.4.2.3.1 From the main menu, select Run an existing method.
- 5.4.2.3.2 Highlight the appropriate method and press **SELECT**.
- 5.4.2.3.3 Left syringe size (uL): 2500.0
- 5.4.2.3.4 Right syringe size (uL): 250.0
- 5.4.2.3.5 **CONFIRM**
- 5.4.2.3.6 The system will purge.

5.4.2.3.7 Place the left diluent tube in the diluent solution and prime the system.

5.5 Sampling

5.5.1 Refer to the Toxicology Unit [Headspace Gas Chromatography to Quantitate and Identify Volatiles in Liquids](#) procedure for sample preparation instructions.

5.5.2 The liquids being analyzed shall be at room temperature before use.

5.5.3 Liquids containing volatile substances shall be covered or sealed to prevent evaporation of the volatiles.

5.5.4 The reservoir containing the diluent (internal standard) solution shall be covered, but not sealed, to prevent a vacuum from forming in the reservoir.

5.6 Application of Procedure on Evidence

5.6.1 Microlab 1000 Plus

5.6.1.1 The following steps may be activated in two ways – by pressing the "ENT" key or by pressing the button on the wand.

5.6.1.2 The sample to be analyzed shall be collected by placing the tubing on the right side of the system into the sample, and aspirating the sample by pressing the button on the wand.

5.6.1.3 The outside of the tubing shall be wiped with a clean Kimwipe or equivalent to remove excess sample residue.

5.6.1.4 The sample/diluent shall be dispensed into the proper vial by pressing the button on the wand again.

5.6.1.5 The seal shall be placed on top of the headspace vial and shall be crimped firmly with the hand crimper. The seal shall be checked to ensure that it is secure and cannot be removed by hand.

5.6.1.6 The tubing shall be washed between each sample by aspirating an air sample and then dispensing the air/diluent into a waste container. (The washing procedure flushes the sample tubing with 1.8 mL of diluent).

5.6.1.7 The outside of the tubing shall be wiped again, and the next sample is ready to be collected.

5.6.2 Microlab 500

5.6.2.1 The following steps may be activated in two ways – by pressing the "run/Stop" key or by pressing the button on the wand.

5.6.2.2 Allow the left syringe to fill and the air gap on the right syringe to fill. The sample to be analyzed shall be collected by placing the tubing on the right

side of the system into the sample, and aspirating the sample by pressing the button on the wand.

- 5.6.2.3 The outside of the tubing shall be wiped with a clean Kimwipe or equivalent to remove excess sample residue.
- 5.6.2.4 The sample/diluent shall be dispensed into the proper vial by pressing the button on the wand again.
- 5.6.2.5 The seal shall be placed on top of the headspace vial and shall be crimped firmly with the hand crimper. The seal shall be checked to ensure that it is secure and cannot be removed by hand.
- 5.6.2.6 The left syringe shall be allowed to fill and the air gap on the right syringe to shall be allowed to fill before proceeding to the next sample.
- 5.6.2.7 The tubing shall be washed between each sample by aspirating an air sample and then dispensing the air/diluent into a waste container. (The washing procedure flushes the sample tubing with 1.8 mL of diluent.)
- 5.6.2.8 The outside of the tubing shall be wiped again and the next sample is ready to be collected

5.7 Calculations – N/A

5.8 Uncertainty of Measurement – N/A

6.0 Limitations – N/A

7.0 Safety

7.1 Refer to Laboratory Safety Manual.

8.0 References

Hamilton Microlab 1000 plus User Manual; part number 610 370 / 01.

Hamilton User=s Manual Microlab 500 B/C Series; part number 69176 (Rev. B).

9.0 Records

- Liquid Handling System Instrument log
- Case Record

10.0 Attachments –N/A

Revision History		
Effective Date	Version Number	Reason
09/17/2012	1	J-03 conversion to ISO format
02/15/2013	2	2.0 - Reworded for procedure merge with Triad Laboratory
11/15/2013	3	Added issuing authority to header