University of Washington Medical Center 1959 NE Pacific Street. Seattle, WA 98195 Transfusion Services Laboratory Policies and Procedures Manual	Original Effective Date: 08-12-2019 Revision Effective Date:	Number: EQ-0010.01

TITLE: **Rainin Pipet-Lite™ XLS Operation and Maintenance**

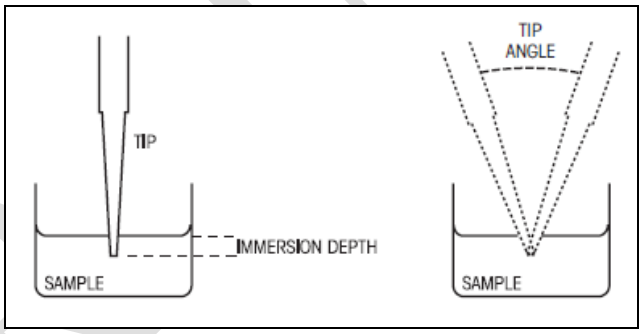
PURPOSE:

To provide instructions for the operation, maintenance and calibration of the Rainin Pipet Lite™ XLS single channel manual pipettes (Models SL-100 XLS and SL-1000 XLS)

PRINCIPLE & CLINICAL SIGNIFICANCE:

POLICIES:

- Each pipette is calibrated before being placed into use, when the piston is replaced and annually thereafter.. Replacement of the O-rings or seals does not require recalibration.
- A new tip is used for each sample to prevent carry-over.
- Pipettes should be stored in a clean dry place when not in use, preferably in the free-standing carousel designed specifically to hold pipettes.
- Liquid should not be allowed to enter the shaft, where it may contaminate the piston and seal.
- **Tip Immersion Depth**
  - Tip immersion depth is critical and should not be exceeded, or the volume measurement may be inaccurate.
    - Model L-100 XLS: 2-3 mm
    - Model L-1000 XLS: 3-6 mm
  - The tip angle is also important – the pipette should be used in a position within 20 degrees of vertical.



- The following guidelines should be maintained when pipetting:
  - Consistent pickup and dispense rhythm.
  - Consistent speed and smoothness when pipetting.
  - Consistent pressure on the plunger button at the first stop.
  - Consistent immersion depth. Pipette vertically, or within 20° of vertical.
  - Pre-rinse the tip twice by aspirating and dispensing sample before actual pickup.
  - Don't invert or lay the pipette flat with liquid in the tip.

SPECIMEN REQUIREMENTS:
NA

REAGENTS/SUPPLIES/EQUIPMENT:

Reagents:	Supplies:	Equipment:
	• Pipette tips Model: L-100 XLS — Rainin Tip No.: RT-L250 Model: L-1000 XLS — Rainin Tip No.: RT-L1000 For cleaning & maintenance • Isopropyl alcohol or distilled water • Lint-free cloth or tissue For calibration • Shipping box with foam insert to prevent damage to pipette • Pipette Calibration Order Form • Prepaid UPS Air Waybill Shipping Bag	• Rainin Pipet-Lite SL-100 XLS • Rainin Pipet-Lite SL-1000 XLS

QUALITY CONTROL:
NA

INSTRUCTIONS:

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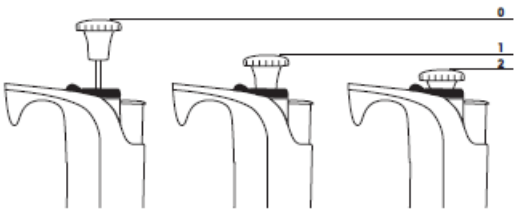
Setting Volume

STEP	ACTION
1	Turn the volume lock lever to the unlock position 

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td>2</td><td>Orient the pipette so you are looking at the volume indicator and reading the volume indicator from the top down
<table>
<tr><th>Model</th><th>Recommended Adjustable Range</th><th>Volume Indicator</th><th>Digits equal to</th></tr>
<tr><td>SL-100 XLS</td><td>10 to 100 uL</td><td> 
</td><td>All black digits = uL</td></tr>
<tr><td>SL-1000 XLS</td><td>100 to 1000 uL</td><td> 
</td><td>Red digit = mL
Black digits = tenths, hundredths of uL</td></tr>
</table></td></tr>
<tr><td>3</td><td>Rotate the plunger button counter-clockwise to increase the volume and clockwise to decrease the volume
• To eliminate errors due to mechanical backlash: when setting the desired volume, first turn the knob 1⁄3 turn above the desired volume. Then turn the knob slowly clockwise until the desired volume is displayed. Always dial down to the desired volume.</td></tr>
<tr><td>4</td><td>Turn the volume lock to the “lock” position to prevent changes to the volume setting 
</td></tr>
</table>

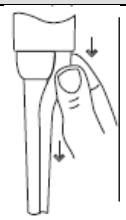
Operation – Aspirating and Dispensing Samples

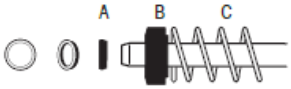
<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td>1</td><td>Set the desired volume per section ‘Setting Volume’</td></tr>
<tr><td>2</td><td>Attach a new tip by pressing the pipette shaft into the end of the tip with light force.

IMPORTANT: The tip will seal properly on the shaft with minimal force – do not use more force than is required</td></tr>
<tr><td>3</td><td>Press the plunger button to the first stop (1 in figure below), and hold it in this position 
</td></tr>
</table>

STEP	ACTION
4	**Aspirating** the sample: • Hold the pipette vertically (or within 20º of vertical) – refer to "Tip Immersion Depth" under Policies above • Place the tip into the sample to the proper depth and relax your thumb pressure on the plunger – do not let go of the plunger button, or the piston may snap up quickly resulting in inaccurate measurement • Pause for about 1 second to ensure the full volume of sample is drawn into the tip • Withdraw the tip from the sample. If any liquid remains on the outside of the tip, touch it off carefully onto a lint-free tissue, taking care not to touch the tip orifice. **NOTE:** Do not let the piston snap up quickly. This may cause sample splash inside the mechanism.
5	**Dispensing** the sample: • Touch the tip end against the side wall of the receiving vessel and press the plunger slowly, past the first stop, to the second stop (2 in step 2 figure), or blowout (bottom of stroke.) • Wait ○ 1 second for 2-300 µL volumes, ○ 1-2 seconds for 1000 µL and larger. (For viscous solutions pause before blowout.) • Still holding the plunger, withdraw the tip, sliding it along the wall of the vessel. Release the plunger.
6	Press the tip ejector button lightly to discard the tip. Use a new tip for each sample to prevent carry-over. Repeat for the next pipetting cycle.

Cleaning and Maintenance

STEP	ACTION
1	Remove the ejector arm by grasping the ejector arm firmly and pulling the arm down 
2	Unscrew the shaft coupling nut and remove shaft
3	Remove the piston assembly (refer to figure on next page) **Important:** Note the order and placement of the seals, retainers, springs and o-rings on the piston assembly. Seals are asymmetrical and must be inserted in the correct orientation. Be careful not to bend the piston.

<table>
<tr><th>STEP</th><th>ACTION</th></tr>
<tr><td></td><td>
<table>
<tr><th>Model</th><th>Then</th></tr>
<tr><td>SL-100 XLS</td><td>• .Remove the seals from the retainers by pushing them out form the back side, preferably with a non-sharp object like a pipette tip.
 

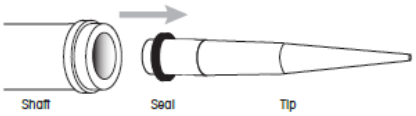
A: Seal (note open edge faces outward)
B: Seal retainer
C: Piston assembly</td></tr>
<tr><td>SL-1000 XLS</td><td>• The seals may remain inside the shaft when the piston assembly is removed. This is normal. (Figure 1)
• The seals may be removed from the shaft by inserting the large end of a tip into the shaft and hooking the seal over it. (Figure 2)
 

Figure 1 Figure 2</td></tr>
</table>
</td></tr>
<tr><td>4</td><td>Inspect the seals, retainers, o-rings, shaft and piston for contamination. Replace the seals and O-rings if necessary

NOTE: If piston corrosion or staining is evident do not use the pipette. Arrangement should be made for manufacturer to replace or assist with replacement of the piston</td></tr>
<tr><td>5</td><td>Clean with either distilled water or isopropyl alcohol and dry with a lint-free cloth or tissue</td></tr>
<tr><td>6</td><td>Apply grease very sparingly to the seal or o-ring by gently rubbing it between the thumb and index finger, ideally using a clean powder-free examination glove. Apply a small amount of grease on the piston as well.

NOTE: Using a clean powder-free examination glove is recommended to grease parts.</td></tr>
<tr><td>7</td><td>Reassemble the pipette in the correct order and orientation.
○ Replace the ejector arm by inserting the shaft through the large opening, align the top with the tip ejector pushrod, and push until the arm snaps in place</td></tr>
<tr><td>8</td><td>Clean the shaft, tip ejector and handle using a damp cloth with distilled water, or isopropyl alcohol</td></tr>
</table>

Calibration

STEP	ACTION
1	Request a quote from Rainin Service (800-472-4646, raininservice.com) for a GxP IOS 17025 Calibration Request any of the following supplies be sent if needed: • Shipping box with foam insert to prevent damage to pipette • Pipette Calibration Order Form

STEP	ACTION
	• Prepaid UPS Air Waybil • Shipping Bag
2	Give the quote to the TSL Operations Manager to request a P.O. # via Purchase Path
3	Complete a Pipette Calibration Order Form including the P.O.#
4	Place the pipette(s) and completed order form in the shipping box IMPORTANT: Do not tape or label the box!! This will prevent reuse of the box.
5	Enter the following for return name, address and phone number on the UPS Air Waybill (Your Name) UWMC Transfusion Service Laboratory 1959 Pacific Street, Room NN601 Seattle, Washington 98195 206-598-6240 **NOTE:** The "ship to" address is: Service Mettler Toledo Rainin, LLC 7500 Edgewater Dr. Oakland, CA 94621
6	Remove and save only the "Shipper's Copy" (page 2) portion of the UPS Air Waybill
7	Place the box inside the provided shipping bag
8	Affix the UPS Air Waybill on the outside of the shipping bag
9	Drop the box off at a UPS pickup location – a UPS dropbox is located on the 1st floor near the RR elevators.

CALCULATIONS/INTERPRETATIONS/RESULTS REPORTING/NORMAL VALUES/CRITICAL VALUES

NA

CALIBRATION:

Calibration is performed prior to initial use and annually hereafter

PROCEDURE NOTES AND LIMITATIONS:

- Pipette can be damaged if there is sample contamination inside the shaft or with dropping the pipette
- When removing the shaft from the pipette body, make sure the spring, seal and seal retainer do not fall off the piston, especially the smaller models, as they may be difficult to find.

- Trouble shooting:

Problem	Possible Cause	Suggested Remedy
Leaks, inaccuracy	Loose shaft	Tighten coupling nut by hand
	Worn seal	Replace seal
	Cracked or split shaft	Replace shaft. If piston bent, replace piston. Contact manufacturer
Rough, jerky, or sticky plunger movement	Contamination inside mechanism	Clean pipette refer to section 'Cleaning and Maintenance'
	Insufficient grease	Apply grease sparingly to seal or o-ring refer to 'Cleaning and Maintenance'

- Replacement parts:

Model	Seal	O-Ring	Shaft	Tip Ejector Arm
L-100XLS	6200-150	6200-151	6202-066	6202-073
L-1000XLS	6200-161	6200-162	6202-068	6202-074

REFERENCES:
Operating Instructions Pipet-Lite™ XLS

RELATED DOCUMENTS:
NA

APPENDIX:
NA

UWMC SOP Approval:

UWMC CLIA Medical Director	Mark H. Wener, MD	Date
Transfusion Service Manager	Nina Sen	Date
Compliance Analyst	Christine Clark	Date
Transfusion Service Medical Director	Monica B. Pagano, MD	Date

UWMC Biennial Review:

	Date
	Date