SOP: Eppendorf Research Plus Pipette Operation and Maintenance

Approvals:

Preparer: Jason McMillan Date: 08JAN14
Reviewer: Dr. Maggie Bryans Date: 10JAN14

1. **Purpose:**
   Operation of Eppendorf Research Plus through to the P-1000.
2. **Scope:**
   Applies to the operation, cleaning, and trouble shooting of the Eppendorf Research Plus, designed to dispense precise volumes of liquid safely.
3. **Responsibilities:**
   3.1. It is the responsibility of the course instructor/lab assistant to ensure that this SOP is performed as directed and to update the procedure when necessary.
   3.2. It is the responsibility of the students/technicians to follow the SOP as described and to inform the instructor about any deviations or problems that may occur while performing the procedure.
4. **References:**
   4.1. Eppendorf Research Plus Operating Manual
   4.1. Tuttnauer 3850 ELV Autoclave SOP
5. **Definitions:** N/A
6. **Precautions:**
   6.1. Volatile solutions: you should saturate the air-cushion of your pipette by aspirating and dispensing the solvent repeatedly before aspirating the sample.
   6.2. Acids or other corrosive liquids that emit vapors; can damage pipette to avoid this remove the tip holder and rinse the piston and O-ring and seal with distilled water.
   6.3. Temperature extremes can damage the Eppendorf Research Plus. Do not pipette liquids having temperatures of above 70^0C or below 4^0C.
7. **Materials:**
   7.1. Eppendorf Research Plus
   7.2. pipette tips
   7.3. beaker
   7.4. weigh boats
   7.5. MilliQ Water
   7.6. lab towels
   7.7. 70% isopropyl alcohol (IPA)
   7.8. autoclave
8. **Procedure:**
   8.1. **Operation**
      8.1.1. The volume of liquid to be aspirated is set using the “Volume Display” which is read top (most significant digit) to bottom (least significant digit).
      8.1.2. Turn the “Volume Adjustment Ring” to select the desired volume. To obtain the maximum accuracy when setting the volume, set the volume 1/3 of a turn above the desired volume and then turn down to the desired volume.
      8.1.3. Double check that the set volume is correct while holding the “Volume Display” at eye level.

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8.1.4. Fit a tip into the tip holder, by using a slight twisting motion when pressing the Eppendorf Research Plus "Spring Loaded Tip Cone" into a pipette tip to ensure a firm and airtight seal. The pipette tip is securely attached to the "Spring Loaded Tip Cone" when it responds with spring loaded action.

8.1.5. Pre-rinse the tip by aspirating the first volume of liquid and then dispensing it back into the sample container or a waste container.

8.2. **Aspirating Liquid**

8.2.1. Press down the "Control Button" to the first stop (measuring stroke).

8.2.2. Immerse the pipette tip vertically approximately 4mm into the liquid.

8.2.3. To aspirate the liquid, allow the "Control Button" to slide back slowly. Maintain the immersion depth to prevent accidental air aspiration.

8.2.4. When pipetting large volumes wait approximately 3 seconds before removing the pipette tip from the liquid. To ensure maximum precision and accuracy the manufacturers recommends wetting each new tip initially by aspirating and dispensing the liquid 1-3 times and then commence pipetting.

8.2.5. Remove the tip slowly from the liquid making sure to slowly wipe the tip against the tube wall to ensure that no outer wetting remains on the tip.

8.3. **Dispensing Liquid**

8.3.1. Place the tip on the tube wall at an angle and press down the "Control Button" to the first stop (measuring stroke) and wait until the flow of liquid stops. Then Press the "Control Button" until it reaches the second stop (blow out) to empty the tip completely.

8.3.2. Continue holding down the "Control Button" and wipe the tip against the tube inner wall and remove the tip from the tube. Let the "Control Button" slide back slowly once outside of the tube.

8.4. **Tip removal**

8.4.1. Tip may now be ejected by pressing firmly on the "Ejector" button into a waste container.

8.4.2. Tip changes are required only if aspirating a different liquid, sample or reagent or volume. Tips should also be changed if aseptic technique is compromised (e.g. if the tip touches the outside of a container).

8.4.3. When you are finished pipetting, re-set the volume of the Eppendorf Research Plus to the maximum volume for proper storage.

8.5. **Leak testing P20 – P200**

8.5.1. Fit a tip onto the Eppendorf Research Plus pipette.

8.5.2. Set to the maximum volume given in the specification.

8.5.3. For volumes <20µl pre-wet the tip several times.

8.5.4. Hold the Eppendorf Research Plus in a vertical position with a full tip for approximately 30 seconds. Do not touch the pipette tip.

8.5.5. Observe the meniscus of the liquid on the tip opening. If there is a leak in the pipette, a droplet will form on the tip opening.

8.5.6. Verify that the tip is on tightly, and repeat the test.

8.5.7. If a droplet appears at the end of the tip there is a leak and the Eppendorf Research Plus needs repair.

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8.6. **Clean the pipette**

Note: Most pipettes are designed so that the parts that normally come into contact with liquid contaminants can easily be cleaned and decontaminated.

8.6.1. Wipe entire pipette with a lab towel dampened with a mild detergent solution.
8.6.2. Wipe entire pipette with a lab towel dampened with MilliQ water.
8.6.3. Remove the ejector sleeve by holding down the ejection button and pulling on the ejector sleeve (Figure 2: Step 1).
8.6.4. Slide up the ring on the lower part with the label "PUSH TO RELEASE" approximately 5mm until the lower part is released (Figure 2: Step 2 & 3).
8.6.5. The lower part is then removed from the upper part (Figure 2: Step 4).
8.6.6. Wipe the ejector sleeve and lower part with a lab towel dampened with a mild soap solution or 70% IPA.
8.6.7. Wipe the ejector sleeve and lower part with a lab towel dampened with MilliQ water.
8.6.8. Refit the lower part into the upper part until it engages audibly.
8.6.9. Refit the ejector sleeve and allow the pipette to dry.
8.6.10. Dispose of lab towels in bio-hazardous waste receptacle.

8.7. **Chemical decontamination**

8.7.1. Spray a lab towel with 70% IPA to dampen the lab towel.
8.7.2. Wipe upper part of body with dampened lab towel.
8.7.3. Wipe ejector sleeve with dampened lab towel.
8.7.4. Wipe entire pipette with a lab towel dampened with MilliQ water.
8.7.5. Leave pipette to dry or wipe pipette dry with lab towel.
8.7.6. Dispose lab towels in bio-hazardous waste receptacle.

8.8. **Autoclaving**

8.8.1. Place the whole Eppendorf research Plus unit into the autoclave
8.8.2. Run the autoclave on the Unwrapped Delicate Instruments per Tuttnauer 3850 ELV Autoclave SOP
8.8.3. Remove the Eppendorf Research Plus unit and allow it to dry completely and cool Down.

8.9. **Trouble shooting**

8.9.1. See the trouble shooting table (Table 1).

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9. Attachments:

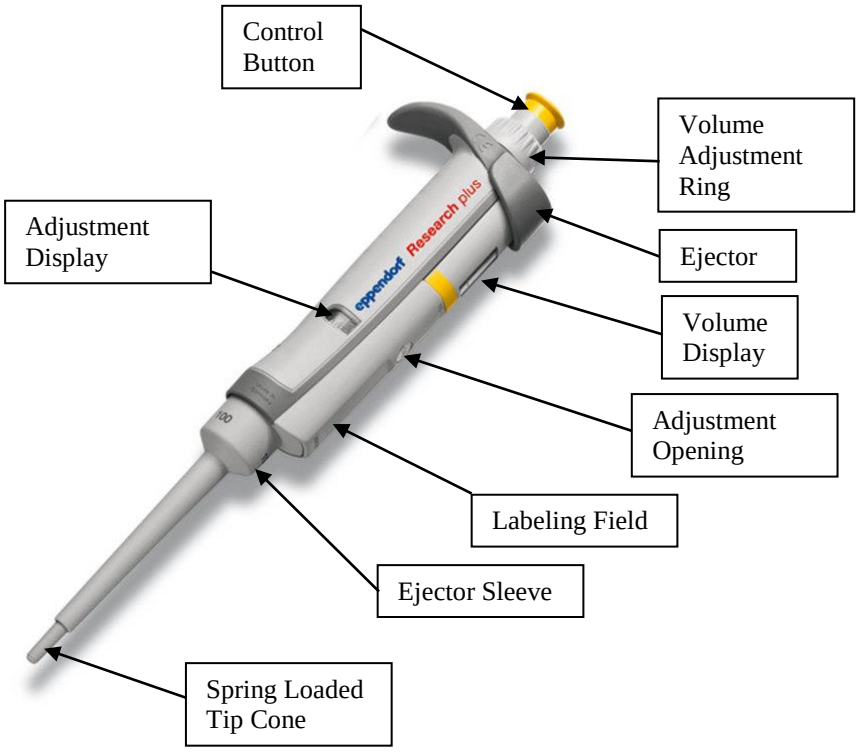

Figure 1: Eppendorf Research Plus

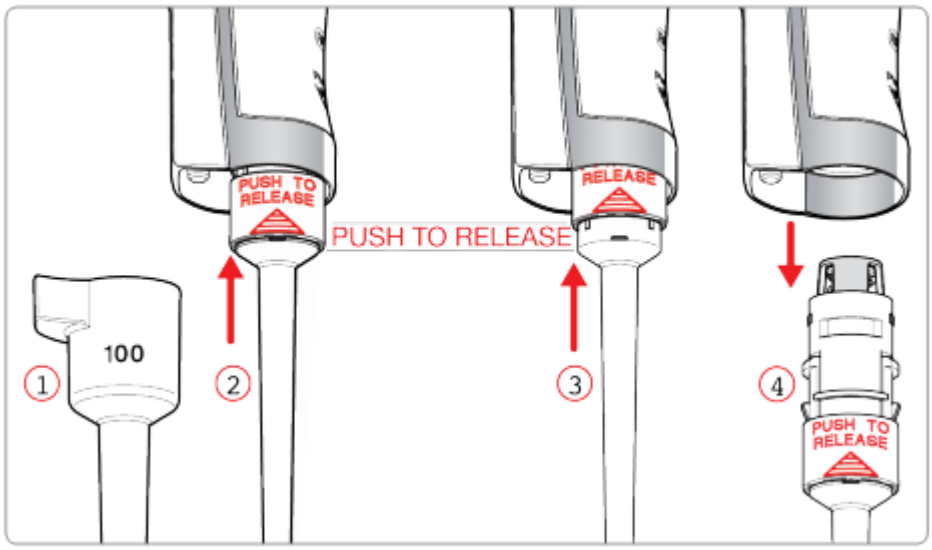

Figure 2: Removing the Lower Part
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Symptom	Possible cause	Solution
Liquid is dripping from the tip and/or the dispensed volume is incorrect.	• The tip is loose or the pipette tip is poorly fitted.	➢ Press the tip on firmly.
	• Liquid with high vapor pressure and/or different density.	➢ Wet the tip several times and adjust the pipette for the liquid used.
	• Pipetted too quickly.	➢ Move the control button slowly.
	• The tip is withdrawn from the liquid too quickly.	➢ Slowly remove the tip with a time delay (approximately 3 seconds) from the liquid.
	• Liquid aspirated with blow-out and dispensed with blow-out.	➢ Repeat dispensing correctly.
	• The piston is soiled or damaged.	➢ Clean the piston, relubricate slightly and/or replace.
	• The tip cone is damaged.	➢ Replace the lower part or channel.
	• The O-rings of the tip cones are damaged.	➢ Replace the O-rings (only 100 µl, 300 µl multi-channel).
The control button jams and does not move smoothly.	• The piston is soiled. • The seal is soiled. • The pipette is blocked.	➢ Clean the lower part. ➢ 5ml and 10ml sizes; replace the protection filter.
The adjustment seal has been removed; the adjustment display has been changed.	• The pipette has been adjusted for another liquid.	➢ Adjust the pipette for the liquid used.
No spring-loading action of the tip cone when taking up pipette tips.	• Spring-loading action is blocked by a locking ring.	➢ Remove the locking ring again.
	➢ The use of a 5ml or 10ml pipette.	➢ No remedy. The tip cone does not respond with spring-loaded action in combination with these sizes.

Table 1: Trouble Shooting
Eppendorf Research Plus Manual

10. History:

Revision Number	***Effective Date***	***Preparer***	***Description of Change***
0	08JAN14	Jason McMillan	Initial release