SOP: Eppendorf Research Plus Performance Verification SOP

Approvals:

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

1. **Purpose:** To verify the calibration of a single channel pipette.
2. **Scope:** Covers the cleaning, decontamination and verification of a single channel pipette.
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. balance operation SOP
   4.2. balance calibration SOP
   4.3. Tuttnauer 3850 ELV Autoclave SOP
   4.4. Eppendorf Research Plus Operation and Maintenance SOP
5. **Definitions:** N/A
6. **Precautions:** N/A
7. **Materials:**
   7.1. balance
   7.2. weigh boats
   7.3. MilliQ water
   7.4. small beaker for holding MilliQ water
   7.5. verification labels
   7.6. verification form
   7.7. verification Pass/Fail form
   7.8. pipette tips
   7.9. Eppendorf Research Plus (P20, P200, and P1000)
   7.10. 70% isopropyl alcohol (IPA)
   7.11. lab towels
   7.12. tweezers
   7.13. thermometer
   7.14. calculator
   7.15. barometer
8. **Procedure:**
   8.1. **Clean the pipette** (See Figure 2.)
   Note: Most pipettes are designed so that the parts that normally come into contact with liquid contaminants can easily be cleaned and decontaminated.
      8.1.1. Wipe entire pipette with a lab towel dampened with a mild detergent solution.
      8.1.2. Wipe entire pipette with a lab towel dampened with distilled water.
      8.1.3. Remove the ejector sleeve by holding down the ejection button and pulling on the ejector sleeve (Figure 2: Step 1).
      8.1.4. Slide up the ring on the lower part with the label “PUSH TO RELEASE”

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approximately 5mm until the lower part is released (Figure 2: Step 2 & 3).

8.1.5. The lower part is then removed from the upper part (Figure 2: Step 4).

8.1.6. Wipe the ejector sleeve and lower part with a lab towel dampened with a mild soap solution or 70% IPA.

8.1.7. Wipe the ejector sleeve and lower part with a lab towel dampened with MilliQ water.

8.1.8. Refit the lower part into the upper part until it engages audibly.

8.1.9. Refit the ejector sleeve and allow the pipette to dry.

8.1.10. Dispose of lab towels in bio-hazardous waste receptacle.

8.2. **Chemical decontamination**

8.2.1. Spray a lab towel with 70% IPA to dampen the lab towel.

8.2.2. Wipe upper part of body with dampened lab towel.

8.2.3. Wipe ejector sleeve with dampened lab towel.

8.2.4. Wipe entire pipette with a lab towel dampened with MilliQ water.

8.2.5. Leave pipette to dry or wipe pipette dry with lab towel.

8.2.6. Dispose lab towels in bio-hazardous waste receptacle.

8.3. Autoclaving

8.3.1. Place the whole Eppendorf research Plus unit into the autoclave

8.3.2. Run the autoclave on the Unwrapped Delicate Instruments per Tuttnauer 3850 ELV Autoclave SOP

8.3.3. Remove the Eppendorf research Plus unit and allow it to dry completely and cool down.

8.4. **Verification of Calibration**

Note: To test the accuracy of the pipette you will pipette a set volume 10 times and then weigh the total pipetted volume. 1mL of MilliQ water should weigh 1g and 1µL should weigh 1mg. Calculate your % Error using the equation below:

$$\frac{\text{Expected Mass - Actual Mass}}{\text{Expected Mass}} \times 100 = \%\ \text{Error}$$

If the % Error is ≤ 2% the pipette passes verification, if the % Error is > than 2% the pipette fails. We will verify the pipette once at the maximum volume for the pipette, once at the ½ maximum volume, and once at the minimum volume. Altogether you will pipette 30 volumes and weigh 3 times for each pipette.

8.4.1. Record the necessary information on the Verification form. Enter information in the empty box to the right of the box specifying the information.

8.4.2. Verify that the calibration label of the balance is within the dated calibration time period.

8.4.3. Fill a small beaker with MilliQ water.

8.4.4. Place the weigh boat on the balance.

8.4.5. Tare the balance and verify that 0.00 is being displayed.

8.4.6. Verify that the pipette is set to the maximum volume (e.g. the maximum volume for a P-20 pipette is 20µL.).

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8.4.7. On the Pipette Verification Form, beside Selected Volume, enter the volume you will be pipetting and the value of that volume times 10 (e.g. for a 20µL pipette you will record 20µL for the selected volume and 200µL for the selected volume times 10.).
8.4.8. Calculate the expected mass by converting the selected volume times 10 using the following conversions: 1µL = 1mg and 1mL = 1g. Use the selected volume times 10 as the volume (e.g. for a 20µL pipette, 200µL multiplied by 1mg/µL = 200mg). Record the expected mass in the box beside Expected Mass.
8.4.9. Verify that the pipette is set to the maximum volume recommended by the manufacturer for the pipette.
8.4.10. Place pipette tip securely on the pipette.
8.4.11. Aspirate MilliQ water into pipette tip from the beaker and dispense it into weigh boat.
8.4.12. Repeat the above step 9 times. Each time you dispense the selected volume mark the Verification form in the numbered box beside Dispense Repetitions.
8.4.13. Record the final mass on the Verification form next to Recorded Mass.
8.4.14. Tare the balance and verify that 0.00 is being displayed.
8.4.15. Set the volume of the pipette to half capacity (e.g. For a P-20 pipette, set it to 10µL.) and verify the volume.
8.4.16. Repeat steps 8.4.9. through 8.4.16 with the pipette set to the half-capacity volume.
8.4.17. Tare the balance and verify that 0.00 is being displayed.
8.4.18. Set the volume of the pipette to the minimum capacity recommended by the manufacturer (e.g. For a P-20 pipette, set it to 2µL.)
8.4.19. Repeat steps 8.4.9. through 8.4.16 with the pipette set to the minimum-capacity volume.
8.4.20. Calculate the % Error (as directed in the note at the beginning of section 8.4) for each test (maximum, half-capacity, and minimum volumes) and record the results on the verification form.
8.4.21. Verify that all fields of the verification form have been filled out and fill out the Pipette Verification Pass/Fail form according to the results of the tests.

9. Attachments:

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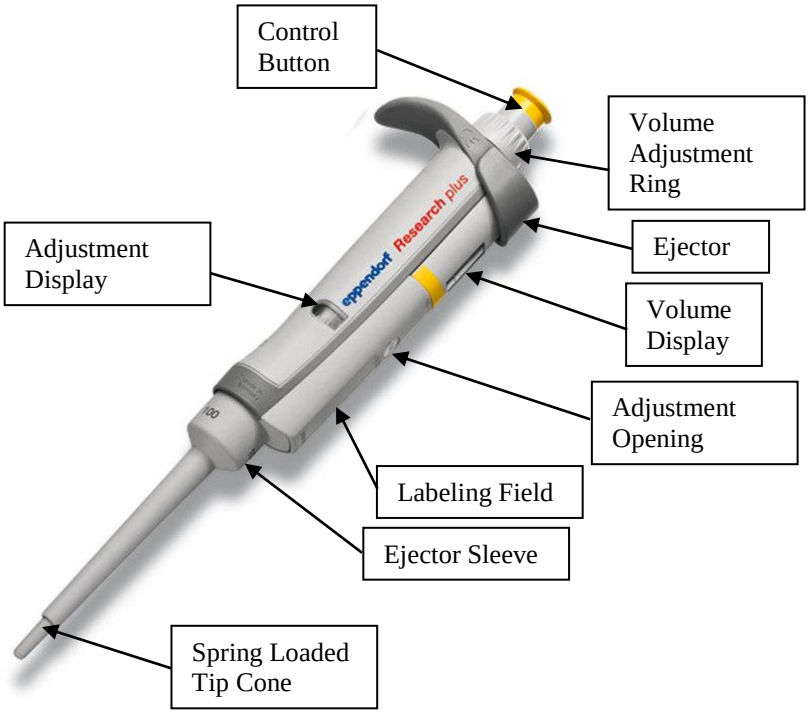

Figure 1: Eppendorf Research Plus

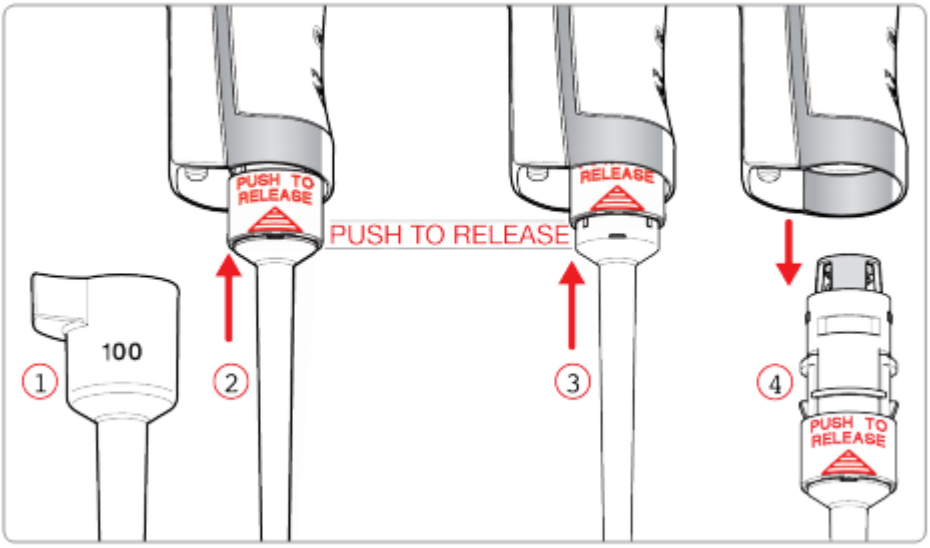

Figure 2: Removing the Lower Part
Eppendorf Research Plus Manual

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10. History

Revision Number	***Effective Date***	***Preparer***	***Description of Change***
0	08JAN14	Jason McMillan	Initial release
1	10JAN14	Jason McMillan	Added pipette verification form

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Pipette Information

Name and Description:_____

Model:_____

Serial Number:_____

Verification		**Pipette**	
Technician		Volume Range	
Date		Number of Channels	

Test Conditions			
Balance Serial #		Balance Model	
Sensitivity		Balance Calibration Date	
Correction Factor		Balance Calibration Technician	
Air Temperature			
Barometric Temperature			
Relative Humidity			

Tests												
Test 1 (Max. volume)												
Selected Volume											Expected Mass	
Selected Volume X 10											Recorded Mass	
Dispense Repetitions	1	2	3	4	5	6	7	8	9	10		
Test 2 (Half cap. volume)												
Selected Volume											Expected Mass	
Selected Volume X 10											Recorded Mass	
Dispense Repetitions	1	2	3	4	5	6	7	8	9	10		
Test 3 (Min. volume)												
Selected Volume											Expected Mass	
Selected Volume X 10											Recorded Mass	
Dispense Repetitions	1	2	3	4	5	6	7	8	9	10		

Test results	
% Error Test 1	
% Error Test 2	
% Error Test 3	
Pass or Fail	