Title: Gilson Pipetman® Performance Verification SOP

Approvals:
Preparer:___Judith Fitzpatrick_____ Date __13Oct09_____
Reviewer:__Kari Britt_____ Date __13Oct09_____

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. Autoclave SOP
   4.4. Gilson Pipetteman® Operation and Maintenance SOP
5. **Definitions:** N/A
6. **Precautions:** N/A
7. **Materials:**
   7.1. Balance
   7.2. 20g and 200g mass weights
   7.3. Weigh boats
   7.4. Deionized (DI) water
   7.5. Small beaker for holding DI water
   7.6. Verification labels
   7.7. Verification form
   7.8. Verification Pass/Fail form
   7.9. Pipette tips
   7.10. Pipetman® P20, P200, and P1000
   7.11. 70% Isopropyl Alcohol (IPA)
   7.12. Lab towels
   7.13. Tweezers
   7.14. Thermometer
   7.15. Calculator
   7.16. Barometer

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8. Procedure:

8.1. Clean the pipette (See Figure 2 page 8)

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 tip ejector.
8.1.4. Wipe the tip ejector with a lab towel dampened with a mild soap solution.
8.1.5. Wipe the tip ejector with a lab towel dampened with distilled water.
8.1.6. Refit the tip ejector and allow the pipette to dry.
8.1.7. 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 tip holder tip ejector with dampened lab towel.
8.2.4. Wipe entire pipette with a lab towel dampened with distilled 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. Verification of Calibration (See Figure 1 page 12)

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 DI 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 it is greater 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.

8.3.1. Record the necessary information on the Verification form.
8.3.2. Verify that the balance is still in calibration with a 20gm and 200g mass.
8.3.3. Verify that the calibration label of the balance is within the dated calibration time period.
8.3.4. Fill a small beaker with DI water.
8.3.5. Place the weigh boat on the balance.
8.3.6. Tare the balance and verify that 0.00 is being displayed.
8.3.7. 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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8.3.8. 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.).
8.3.9. 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.
8.3.10. Verify that the pipette is set to the maximum volume recommended by the manufacturer for the pipette.
8.3.11. Place pipette tip securely on the pipette.
8.3.12. Aspirate DI water into pipette tip from the beaker and dispense it into weigh boat. Refer to Figure 1 page 6 for proper operation of the pipette.
8.3.13. Repeat the above step 9 times. Each time you dispense the selected volume mark the Verification form in the numbered box beside Dispense Repetitions.
8.3.14. Record the final mass on the Verification form next to Recorded Mass.
8.3.15. Tare the balance and verify that 0.00 is being displayed.
8.3.16. Set the volume of the pipette to half capacity (e.g. For a P-20 pipette, set it to 10µL.) and verify the volume.
8.3.17. Repeat steps 8.3.9. through 8.3.16 with the pipette set to the half-capacity volume.
8.3.18. Tare the balance and verify that 0.00 is being displayed.
8.3.19. 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.)
8.3.20. Repeat steps 8.3.9. through 8.3.16 with the pipette set to the minimum-capacity volume.
8.3.21. Calculate the % Error (as directed in the note at the beginning of section 8.3) for each test (maximum, half-capacity, and minimum volumes) and record the results on the verification form.
8.3.22. 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:

9.1. Figure 1: Calibration Equipment and Supplies
9.2. Pipette Performance Verification Form: Document 4.24.1
9.3. Pipette Performance Verification pass/Fail form: Document 6.24.2

10. History:

Name	Date	Amendment
Bob O'Brien	10Jul07	Initial Release
Bob O'Brien	11May08	College name change, add photographs, reword to clarify
Judith Fitzpatrick	13Oct09	Added directions for using 3 different volumes for calibrating the same pipette.

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Mary Jane Kurtz and Sonia Wallman	28May10	Calibration changed to Performance Verification

Figure 1: Calibration Equipment and Supplies