

## Standard Operating Procedure

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### Operation of Pipettes

#### 1. Introduction

##### 1.1. Purpose

To outline the procedure for operation pipettes in the TRACES Centre and the undergraduate laboratories. This procedure describes how to properly dispense liquids using a volumetric air displacement pipette.

Best practices of pipette operation are described in detail.

##### 1.2. Scope

Applicable to TRACES Centre and UG Laboratory pipetting equipment.

##### 1.3. Responsibility

User

##### 1.4. Accountability

TRACES Manager/Course Instructor

#### 2. Referenced Documents

2.1. ISO 8655-1:2002

2.2. ASTM E1154-14:2014

#### 3. Equipment

3.1. **Pipette**, of the appropriate volume

3.2. **Stock Solution**, appropriately sized container to allow pipette to operate

3.3. **Diluted Solution**, appropriately container to ensure efficient dispensing and dilution

#### 4. Procedures

##### 4.1. Pipette Operation

For all purposes of use in the TRACES Centre and undergraduate laboratories, pipettes operate in the forward mode.

## Standard Operating Procedure

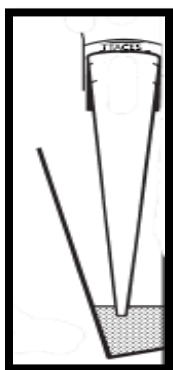
**4.1.1. Pipette Selection:** Select the pipette that will ensure dispensing of a SINGLE volume will accomplish the task required (i.e. If 1000uL is required do not select 500uL pipette- select 1000uL pipette)

**4.1.2. Dispensing Pipetting Solution:** Affirm that the dispensing solution is NOT from the original stock solution. Pour the stock solution that requires pipetting into a clean vessel for dispensing

**4.1.3.**

**4.1.4. Aspirating Liquid:**

- Attach pipette tip firmly; ensure good contact by gently pushing up on the tip.
- Press the push-button of the pipette down to the intermediate stop position.
- Immerse the pipette tip vertically into the water.



**Figure 1. Immerse tip**

Volume, $\mu\text{L}$	Immersion Depth, mm
1 to 100	2 to 3
101 to 1000	2 to 4
1.1 to 10 mL	3 to 6
Reproduced from ASTM E1154-14:2014	

**Table 1.** Appropriate immersion depth

- Allow the push-button to move up to the top stop position slowly and smoothly.

**4.1.5. Dispensing Liquid:**

- Place the pipette tip at an angle between 10-45° against the inside wall of the receiving vessel.
- Slowly press the push-button down to the first stop to empty the tip and wait 1 s.

## Standard Operating Procedure

- c) To ensure the tip is emptied completely gently pull the tip along the side the vessel maintaining the angle from b) while pressing down the push-button to the final stop.
- d) Allow the push-button to return to the top stop position.

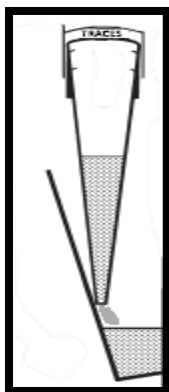


Figure 2. Dispensing Liquid

### 4.1.6. Handling, Care and Maintenance:

- When attached to a tip (filled or empty) do not lay down the pipette horizontally.
- Avoid allowing a temperature difference between pipettes, tips and liquid as this may lead to incorrect dispensing volumes.
- Do not allow any liquid to enter the pipette.
- Do not clean the pipette with aggressive solutions (acetone, DCM, etc.)

### 4.2. Calibration of a Variable Volume Pipette (TRACES Staff/UG Technicians ONLY)

For each pipette to be calibrated three volumes will be tested:

- The nominal volume,
- Approximately 50% of the nominal volume,
- The lower limit of the useful volume range, or 10 % of the nominal range (whichever is greater)
- Calibration by QUALIFIED Staff is done semi-annually or when repairs or maintenance has been done on the pipette in question