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Title: **Use and Maintenance of Air and Positive Displacement Pipettes**

Version: **v2**

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SOP History		
Number	Date	Reason for Change
v1	01/01/2013	Original
V2	01/01/2018	Update

1.0 Purpose –

The purpose of this SOP is to outline the principles of the routine use, maintenance and calibration of air and positive displacement pipettes in Laboratory 248 at the St Andrews School of Medicine (SASoM).

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2.0 Scope –

This SOP applies to routine use, maintenance and calibration of all air and positive displacement pipettes in the SASoM.

3.0 Responsibilities –

It is the responsibility of all users of the air and positive displacement pipettes within the SASoM to comply with this SOP.

4.0 Procedure –

Setting volume:

For variable volume pipettes, the volume is set by rotating the adjustment mechanism until the desired volume is displayed in the window.

The mechanism should be turned above the desired volume and then brought back down to it.

This operation is controlled by the push button which should be operated slowly with steady speed at all times and the pipette should be held approximately vertically.

Pipetting technique:
Fit an appropriate tip to the pipette and depress the button to the first stop.

Holding the pipette approximately vertically, immerse the tip slightly below the surface of the liquid and slowly release the button.

Withdraw the pipette from the solution and, if necessary, wipe away any drops from the outside of the tip without touching the tip orifice.

Deliver the liquid by gently depressing the push button to the first stop and, after a short delay, depressing the button all the way to the second stop.

Withdraw the tip from the liquid and release the button to the neutral position.

Always pipette and discard one volume to wet the pipette tip.

Calibration/Performance Check and Adjustment:
The calibration of each pipette in use must be checked at a maximum of 6 months, plus after every servicing or maintenance operation.

Each pipette will carry a label identifying its set number and next calibration due date.

General Function:
Check the pipette for signs of damage and poor action. No damage should be apparent and the pipetting action should be smooth.

Accuracy of pipetting should be confirmed before servicing so that any possible impact on previous work can be assessed.

Seal Check:
Attach a clean pipette tip to the pipette.

Draw up the maximum volume allowed by the pipette (of distilled/deionised water).

Suspend the pipette vertically, tip downwards for ca 1 minute.

Observe droplet formation form the tip.

If a drop forms then the pipette should be cleaned and the seals replaced as necessary.

Calibration Check:
Ensure balance to be used is level and within calibration. Record its identity on the form Pipette Calibration Standard Form For 20-5000mg weights, use at least a 4 place balance and for weights <20mg, use at least a 5 place balance.

Set the volume on the pipette according to the pipette size.

Attach a clean pipette tip to the pipette.

Pipette and discard one volume to wet the pipette tip.

Pipette deionised water (at ambient temperature) into a tared vessel on the balance. Record the weight of each volume on the form and repeat until 10 volumes have been dispensed. Work as quickly and as accurately as possible to minimise loss of water by evaporation.

Any dispensing operation where there is a pipetting error e.g. water is retained in the tip, may be rejected and replaced with an additional weight.

Calculate and record the mean dispensing weight. This value should be within the range of +/- 2% of the expected weight dependent on the volume pipetted (i.e. 20ul = 20ug, 100ul = 100ug etc.).

Each individual accepted weight should be in the range +/- 10% of the mean dispensing weight.

If the mean dispensing weight and the individual acceptance weights are inside the specified range, then the pipette is acceptable for use.

If the mean dispensing weight or and/or any individual weights are outside the specified range, the pipette should be rechecked up to a total of 3 times. The pipette is acceptable if the individual and mean weights obtained from 2 out of 3 checks are within the specified range.

Unacceptable pipettes should be re-calibrated after maintenance has been carried out and an assessment made as to the impact on work performed when the pipette was out of calibration.

If pipettes are found to be faulty and cannot be easily repaired, they will be marked as ‘Faulty, do not use’ and the responsible person will be contacted to arrange for expert maintenance to be carried out.

5.0 Personal protection –
Howie coat must be worn at all times.

6.0 Training –
All users have to be trained before using or calibrating the pipettes by a designated person.

7.0 Related documents –

7.1 Equipment manual

7.2 Equipment Maintenance Log

7.3 Equipment Maintenance Information sheet

7.4 Risk assessments – RA/MH/002

8.0 Approval and sign off –

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