HEALTH HOLDING

HAFER ALBATIN HEALTH CLUSTER
MATERNITY AND CHILDREN HOSPITAL

Department:	Laboratory and Blood Bank		
Document:	Multidisciplinary Policy and Procedure		
Title:	Quality Control Procedures and Results for Pipets Check		
Applies To:	All Laboratory Staff and Biomedical Engineers		
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1. PURPOSE:

1.1 To establish and document a protocol for qualifying and certifying all pipets in the laboratory before being put into use.

2. DEFINITONS:

2.1 Pipet is an equipment used in the laboratory to transport and/or measure a specific volume of liquid. It is an essential requirement for all quantitative tests.

3. POLICY:

3.1 The policy gives detailed protocol to perform quality check on the pipets and certify them. It is applicable to all the pipets in use which may be of fixed or variable volumes.

3.2 As the protocol is not available pipettes will be calibrated by a company Specialized in calibration

4. PROCEDURE:

4.1 All pipets in the laboratory should be given a unique ID No. that should include section and a number.

Department:	Pipet ID Numbering starts from:
Chemistry	CHEM – 01
Immunochemistry	IMMUN – 01
Haematology	HEMA – 01
Blood Bank	BB – 01
Microbiology	MICRO – 01
Serology	SERO – 01

4.2 The pipet is checked initially to know that the plunger mechanism is functional by pressing the plunger knob all the way down with the disposable tip immersed in the test liquid to allow the liquid to be drawn into the pipette as per the volume marked on the pipette.

4.3 By depressing the plunger knob, the pipet delivers its contents. The tip with its residual contents should be discarded.

4.4 Precede to pipet Precision / Quality Check after using a fresh tip.

4.5 Precision/Quality Check Procedure:

4.5.1 It should be applied on the issue of a new pipet before putting it to lab use, and as a pipet quality check every 6 months for all pipets in-use. The methods are as followed:

4.5.1.1 Ensure that all the items to be used are at ambient room temperature.

4.5.1.2 Record the temperature of the distilled water to be used for pipet quality check.

4.5.1.3 Put a plastic cup on the precision balance sensitive to 0.1mg and press zero buttons.

4.5.1.4 Pre-wet the pipet tip with the distilled water 2-3 times and discard the water used.

4.5.1.5 Fill the pipette tip with the distilled water to maximum volume, wipe the outside surface of the tip and dispense the water into the weighing cup.

4.5.1.6 Record the weight of the water (in mg).

4.5.1.7 Repeat recording the weight of ten times more.

4.5.1.8 Calculate the volume in µl for each weight by using this equation:

$$\text{Volume (in µl)} = \frac{\text{Weight (in mg)}}{\text{Factor}}$$

(The factor value in the equation can be obtained from the following table according to the ambient room temperature)

Temperature (C°)	Weight to volume conversion factor
17	1.001
18	1.001
19	1.002
20	1.002
21	1.002
22	1.002
23	1.003
24	1.003
25	1.003
26	1.003
27	1.004

Table 1: shows the weight to volume conversion factor according to the Ambient Room Temperature

4.5.1.9 Calculate the mean, SD and CV of the dispensed volume as follows:

$$\text{Mean} = \frac{\text{sum of volumes}}{10}$$

$$\text{SD} = \frac{\text{square root of (sum of (mean – individual value)}^2\text{)}}{9}$$

$$\text{CV} = \frac{\text{SD}}{\text{Mean}} \times 100$$

4.6 From the mean, calculate the percentage deviation from the expected volume by the formula:

$$= \left| \frac{\text{Expected volume – Delivered volume}}{\text{Expected volume}} \right| \times 100$$

4.7 If the percent of variation is equal to or less than= < 3%, then the pipet pass the check and no need to calibrate it.

4.8 Once the quality check is complete the "PASS" status certificate should be documented, and the pipette labelled, "certified "with the date of Quality Check performed. The date of next quality check should be 6 months from the certified date which should be marked on the pipette.

4.9 For variable pipets, 10%, 50%, and 100% of its volume should be checked.

4.10 Routine Maintenance of the precision checked Pipets during use:

4.10.1 Always use the specified tips.

4.10.2 Never wash and reuse tips.

4.10.3 Ensure that the tip is fitted firmly to the pipet.

4.10.4 Keep the pipet always clean.

4.10.5 Always pipet in a vertical position.

4.10.6 Never leave the pipet on its side with liquid in the tip.

4.10.7 Return the pipet to its stand after use.

4.10.8 Operate by a slow and smooth consistent procedure to avoid bubbles or foaming.

4.10.9 Avoid touching the pipet head. Decontaminate after use.

4.11 Pipet Calibration:

4.11.1 Refer to the manufacturer manual book to calibrate the pipet volume.

4.11.2 In general, use the calibration tool provided by the manufacturer to adjust the volume.

4.11.3 Rotate the calibration tool clockwise or counter clockwise to increase or decrease the pipet volume respectively.

4.11.4 After calibrating the pipet remove the tool carefully.

4.11.5 Recheck the precision.

5. MATERIALS AND EQUIPMENT:

5.1 Sensitive Electronic Balance with calibration facility.

5.2 Pipet tips, Thermometer, and Distilled water.

5.3 Pipet Quality Check forms

5.3.1 Fixed Volume Pipet.

5.3.2 Variable Volume Pipet.

6. RESPONSIBILITIES:

6.1 All laboratory staff using the pipettes is responsible for maintaining and checking whether the pipette check done, and the duration of validity are strictly followed.

6.2 Biomedical Engineers are responsible for pipet checking

7. APPENDICES:

7.1 Fixed volume pipet

7.2 Variable volume pipet

8. REFERENCES:

8.1 Calibration frequency for pipettes, Artel Lab Report: Issue 6, June 2009.

8.2 Blood Safety and Clinical Technology, Quality Assurance in Bacteriology and Immunology, WHO Regional office for south east Asia, 2012.

8.3 Improving method validation results by optimizing pipette calibration frequency, George Rodrigues, January 2003.

9. APPROVALS:

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Appendix 7.1

Kingdom of Saudi Arabia
Hafar Al Batin Health Cluster
Maternity and Children Hospital

المملكة العربية السعودية
التجمع الصحي بحفر الباطن
مستشفى الولادة والأطفال

FIXED VOLUME PIPET

DEPARTMENT: ..... **DATE:** .....

PIPET ID:	
PIPET SCALE:	**µl**
AMBIENT ROOM TEMPERATURE:	
100% OF NOMIAL VOLUME:	**100%**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
MEAN	
STANDARD DEVIATION	
PRECISION (CV) %	
TARGET VOLUME	
ACCURACY	
% OF VARIATION	
PASS OR FAIL	
CORRECTIVE ACTION	

PERFORMED BY: .....
EXPIRATION DATE: .....
SUPERVISOR REVIEW: .....

Appendix 7.2

Kingdom of Saudi Arabia
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المملكة العربية السعودية
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مستشفى الولادة والأطفال

VARIABLE VOLUME PIPET

DEPARTMENT: ..... **DATE:** .....

PIPET ID:			
PIPET SCALE:		**µl**	
AMBIENT ROOM TEMPERATURE:			
100% OF NOMIAL VOLUME:	**10%**	**50%**	**100%**
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
MEAN			
STANDARD DEVIATION			
PRECISION (CV) %			
TARGET VOLUME			
ACCURACY			
% OF VARIATION			
PASS OR FAIL			
CORRECTIVE ACTION			

PERFORMED BY: .....
EXPIRATION DATE: .....
SUPERVISOR REVIEW: .....