PREVENTATIVE MAINTENANCE
PIPETTE

PHYSICAL INSPECTION
- INSPECT CASE ____
- INSPECT TIP ____
- EASE OF MOVEMENT – SPINDAL AND DISPENSER ____
- ENSURE DISPENSE VALUES CAN BE REACHED ____

CALIBRATION
- DETERMINE AIR AND WATER TEMPERATURE, HUMIDITY, AND BAROMETRIC PRESSURE AND RECORD VALUES.
- CALCULATE EVAPORATION RATE.

DETERMINING EVAPORATION RATE (use distilled water)
- PERFORM A SIMULATED WEIGHING; HOWEVER DO NOT ADD WATER TO THE WEIGHING VESSEL ON THE BALANCE. INSTEAD RETURN THE DISTILLED WATER THAT IS STILL IN THE PIPETTE TO THE RESERVOIR FROM WHICH IT CAME.
- RECORD THE WEIGHT LOSS THAT OCCURS DURING THE TIME INTERVAL MEASURED ABOVE.
- REPEAT THIS PROCEDURE THREE MORE TIMES, AND CALCULATE THE AVERAGE WEIGHT LOSS.
- ROUND THE WEIGHT LOSS TO THE NEAREST 0.0001g, AND CONVERT IT TO A POSITIVE NUMBER.
- THIS IS THE EVAPORATION RATE e.

DETERMINING ACCURACY AND PRECISION (Please use distilled water)
- INSTALL A NEW PIPETTE TIP. PRERINSE TIP WITH DISTILLED WATER
- PLACE WEIGHING VESSEL ON BALANCE AND TARE WITH DOORS CLOSED
- DISPENSE AMOUNT (whatever is being tested) INTO THE WEIGHING VESSEL. Do not allow any time to elapse between aspiration and dispensing of liquid.
- CLOSED BALANCE DOOR AND RECORD THE READING WHEN IT REACHES EQUILIBRIUM.
- REPEAT MEASUREMENTS 9 TIMES FOR ACCURACY AND RECORD VALUES.

TESTS RESULTS

Record the results of each test including the test conditions. The data should include:

Measured test conditions

- Ambient air temperature
- Water temperature
- Humidity
- Barometric Pressure
- Z factor (The Z factor is required in the volumetric calculations to compensate for the density of the water at the test conditions – get z factor from sheet.)
- The measured mean evaporation *e*
- The 4 or 10 individual mass readings

The following values should be calculated:

Mean Measured Mass = (sum of individual weight measurements) / (number of readings)

Measured Volume (corrected) = (Mean Mass + Mean Evaporation) × (Z factor)

% Accuracy = ((Measure Volume/Expected Volume) / Expected Volume) *100

Accuracy _____

Skill: 1 BMET **Time:** 1.00 hr

Date: **Signature:** _____

APPENDIX A

Z Factor Chart (mL/g)

To find the Z factor, locate the water temperature closest to the temperature measured during the test, then follow along that row to the column that represents the nearest Barometric Pressure measured during the test. That number is the Z factor (e.g., 18.0 °C and 680 mm Hg = 1.0024 Z factor).

Table 2. Z Factor Chart

Barometric Pressure					Sea Level	
mm Hg	600	640	680	720	760	800
mbar	800	853	907	960	1013	1067
kPa	80.0	85.3	90.7	96.0	101.3	106.7
in. Hg	23.6	25.2	26.8	28.3	29.9	31.5
Water Temperature						
15.0	1.0018	1.0018	1.0019	1.0019	1.0020	1.0020
15.5	1.0018	1.0019	1.0019	1.0020	1.0020	1.0021
16.0	1.0019	1.0020	1.0020	1.0021	1.0021	1.0022
16.5	1.0020	1.0020	1.0021	1.0022	1.0022	1.0023
17.0	1.0021	1.0021	1.0022	1.0022	1.0023	1.0023
17.5	1.0022	1.0022	1.0023	1.0023	1.0024	1.0024
18.0	1.0022	1.0023	1.0024	1.0024	1.0025	1.0025
18.5	1.0023	1.0024	1.0025	1.0025	1.0026	1.0026
19.0	1.0024	1.0025	1.0025	1.0026	1.0027	1.0027
19.5	1.0025	1.0026	1.0026	1.0027	1.0028	1.0028
20.0	1.0026	1.0027	1.0027	1.0028	1.0029	1.0029
20.5	1.0027	1.0028	1.0028	1.0029	1.0030	1.0030
21.0	1.0028	1.0029	1.0030	1.0030	1.0031	1.0031
21.5	1.0030	1.0030	1.0031	1.0031	1.0032	1.0032
22.0	1.0031	1.0031	1.0032	1.0032	1.0033	1.0033
22.5	1.0032	1.0032	1.0033	1.0033	1.0034	1.0035
23.0	1.0033	1.0033	1.0034	1.0035	1.0035	1.0036
23.5	1.0034	1.0035	1.0035	1.0036	1.0036	1.0037
24.0	1.0035	1.0036	1.0036	1.0037	1.0038	1.0038
24.5	1.0037	1.0037	1.0038	1.0038	1.0039	1.0039
25.0	1.0038	1.0038	1.0039	1.0039	1.0040	1.0041
25.5	1.0039	1.0040	1.0040	1.0041	1.0041	1.0042
26.0	1.0040	1.0041	1.0042	1.0042	1.0043	1.0043
26.5	1.0042	1.0042	1.0043	1.0043	1.0044	1.0045
27.0	1.0043	1.0044	1.0044	1.0045	1.0045	1.0046
27.5	1.0044	1.0045	1.0046	1.0046	1.0047	1.0047
28.0	1.0046	1.0046	1.0047	1.0048	1.0048	1.0049
28.5	1.0047	1.0048	1.0048	1.0049	1.0050	1.0050
29.0	1.0049	1.0049	1.0050	1.0050	1.0051	1.0052
29.5	1.0050	1.0051	1.0051	1.0052	1.0052	1.0053
30.0	1.0052	1.0052	1.0053	1.0053	1.0054	1.0055

Source: *Determining Performance of Volumetric Equipment*, vol. 4 No. 6, National Committee for Clinical Laboratory Standards (NCCLS), May 1984