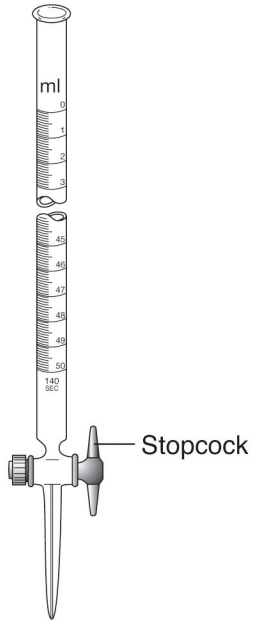
Section 2.4 Burets

Buret Calibration (lab manual, pg 3.9)

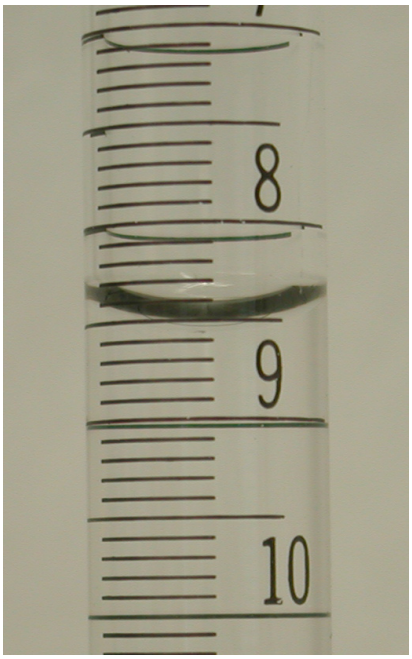
Table III-3. Data and Calculations for Calibration of 50-mL Buret (At 25°C)

Approx. Interval	Buret Readings	Apparent Volume	Weight	Apparent Weight	True Weight	True Volume	Correction	Cumulative Correction
mL	mL	mL	g	g	g	mL	mL	mL
Initial	0.03B†		36.450E					
0-10	10.02	9.99	46.420	9.970	9.981	10.01	0.02	0.02
10-20	20.01	9.99	56.381	9.961	9.972	10.00	0.01	0.03
20-30	30.01	10.00	66.362	9.981	9.992	10.02	0.02	0.05
30-40	39.98	9.97	76.264	9.902	9.913	9.94	-0.03	0.02
40-50	49.99A	10.01	86.205D	9.941F	9.952	9.98G	-0.03	-0.01C



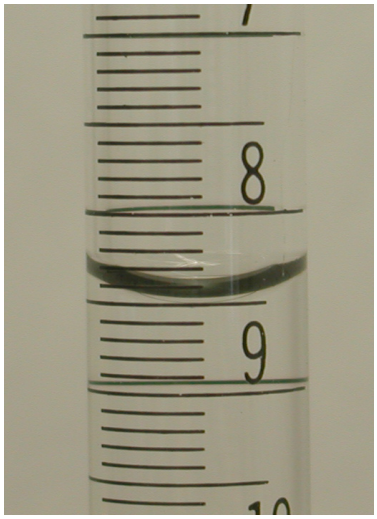
•basically done in the same manner as pipet (dispensing and weighing)
•**Must** be able to read buret to 0.01 mL

•buret must be clean
• rinse with titrant using buret funnel (partial fill, tilt and roll)
• no air bubbles in tip
• no leaks
• clamp vertically
• remove funnel
• bring to ~0.00 mL
• touch off drop
• eye should be at meniscus to read, use a buret card



From below
8.50 mL

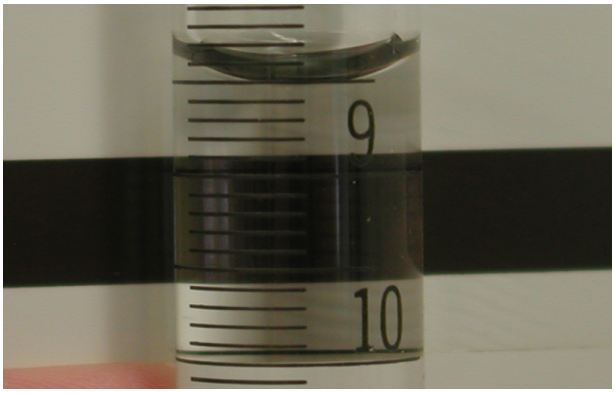
At meniscus level (correct)
8.48 mL

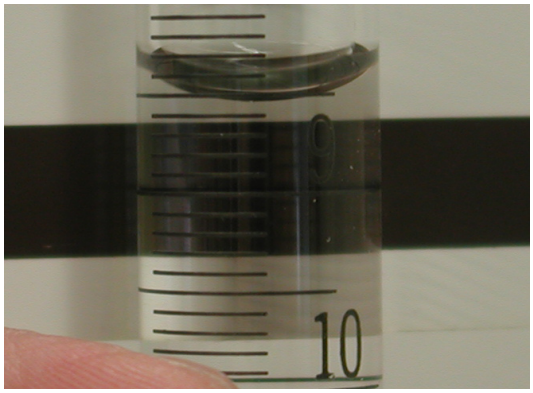


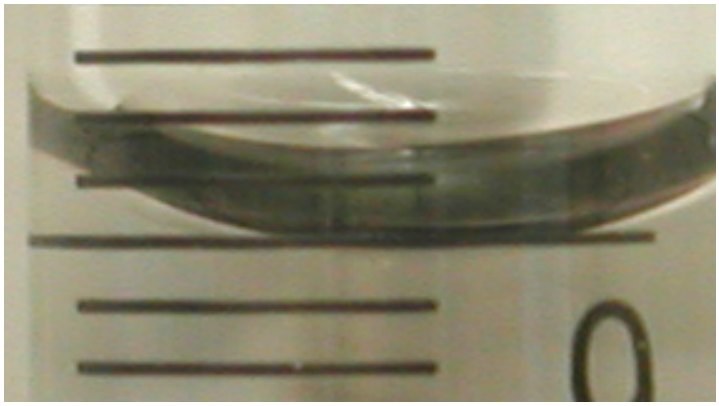
From above
8.45 mL

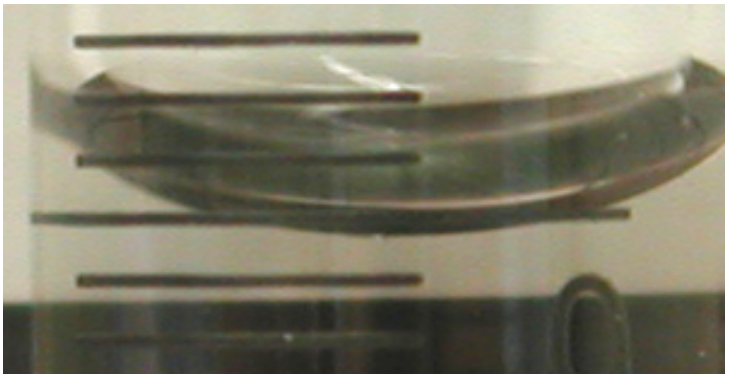
Reading card highlights meniscus, makes it appear lower

(too far below) (correct position)





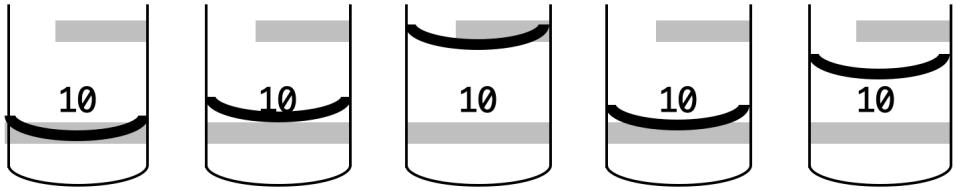




Too far below
8.52 mL

Correct position
8.53 mL

Interpolating Volumes
(marker line width is 0.02 mL)



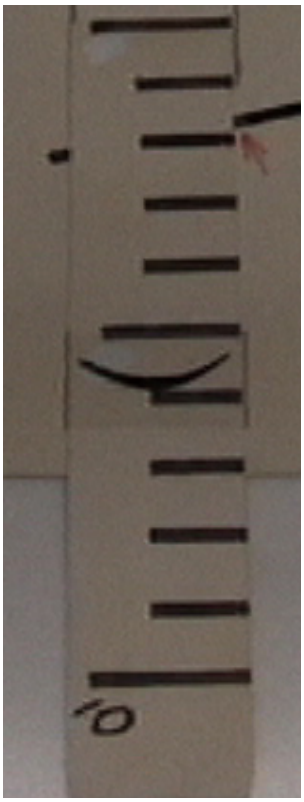
10.02 10.00 9.93 10.01 9.95

Bottom of line

Top of line

•Space between two lines is thus only 0.08 mL
•When between lines try reading from the line above and from the line below and make sure you get the same number.
•Practice in lab - careful interpolation is the key to reproducible reading of the buret

Practice Readings



9.60 mL

9.62 mL

9.63 mL

9.65 mL

9.68 mL

Buret tolerance is ± 0.05 mL

Relative error = (± 0.05 mL)/(50 mL) x 100% = 0.1% = 1 ppt

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Check 1: $A - B + C \cong D - E + 5(G - F)$ within 0.02 mL

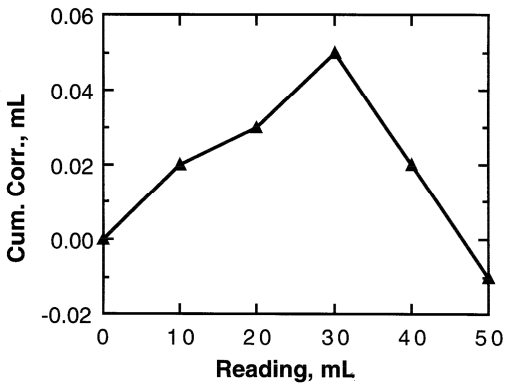
Check 2: duplicate 10 mL interval corr. agree within 0.02 mL
duplicate cumm. Corr. agree within 0.04 mL

If duplicate buret calibrations don't agree, repeat calibration.

Buret Calibration Chart

Plot the average of the cumulative correction of two matching trials to three decimal places. (front of lab notebook)

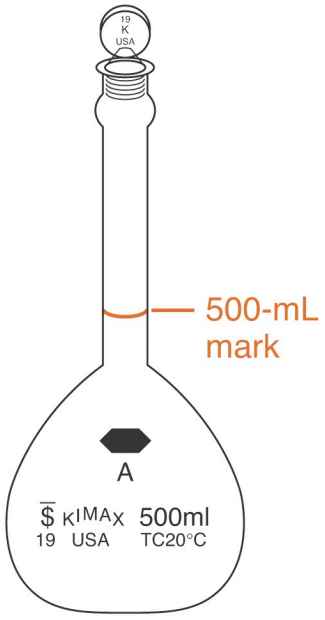
Future Use:
•Add the correction terms to the measured values
•Take the difference between initial and final volumes



Aliquot Procedures

- Use clean pipet
- Rinse pipet with small volumes of sample
- Draw liquid just up to expanding region: level it and rinse
- Discard liquid and repeat two more times
- Draw sample above mark
- Wipe tip with Kimwipe
- Bring meniscus to top of volume marker line
- Transfer liquid to vol. flask with pipet vertical, tip touching side
- Allow 5 s to fully drain. Rotate 360°

- Dilute in clean volumetric flask
- Rinse down sides of vol. flask with deionized water
- Fill 2/3 full and swirl to mix
- Bring solution level to top of volume marker line
- Mix well by inverting and shaking ten times



(*a*)

(Recognizing dirty volumetrics)

Fighting Evaporation

- We may make solutions the week before titrations
- Evaporation will change the concentration
- Thermal expansion will change volume

Fix:

- Dilute to the mark on the day of your titrations
- Dilute when first prepared then stopper tightly and wrap with parafilm to prevent evaporation
- Dilute when first prepared
- then pipet into conical flasks on the same day,
- wrap both with parafilm to prevent evaporation.

How to Clean Dirty Glassware

- First try to use soap and wash to rinse, use brush for larger glassware
- Use concentrated sulfuric acid to coat the inner surface of glassware. Wash immediately. Pour all acid back into the bottle

Caution: Concentration sulfuric acid is extremely corrosive
Leave acid in fumehood at all times, work in the fumehood only.