

Section 2.6 Pipets

TD = To Deliver

(volumetric flask = TC = To Contain)

10 mL Class A transfer pipet = ± 0.02 mL

Correct use of pipet (lab manual, pg ??)

Use clean pipet - water drains evenly with no spots

- 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°

Pipet Calibration (lab manual, Sec. 3)

Calibrate 10 mL pipet by weight

Empty bottle = 24.198 3 g

Filled bottle = 34.141 7 g

Lab temperature = 22 °C

What is volume dispensed by pipet?

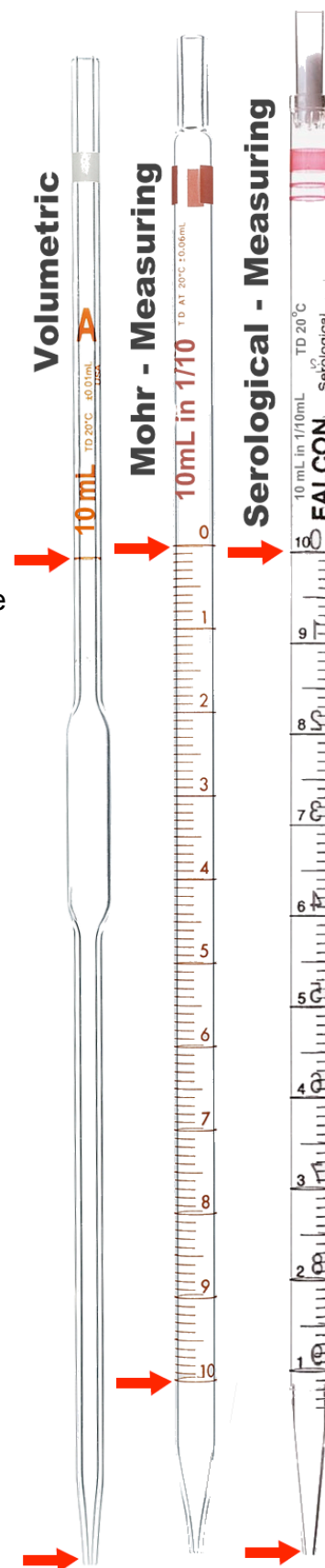
Calculation:

$$\begin{array}{r} 34.141\ 7\ \text{g} \\ - 24.198\ 3\ \text{g} \\ \hline 9.943\ 4\ \text{g} \end{array}$$

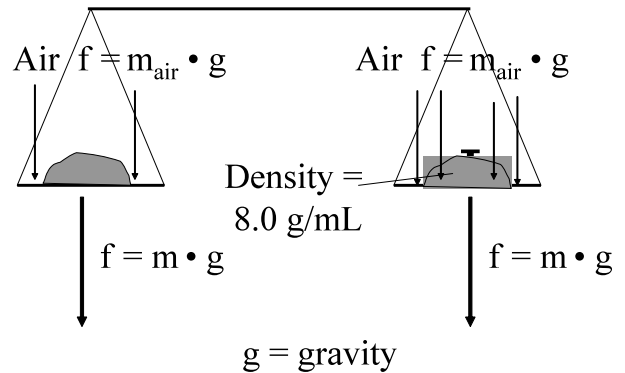
Volume = mass/density

| Temp. (C) | Lab man. Tab. III-2 density (g/mL) | Harris Tab. 2-7 density (g/mL) |
|-----------|---------------------------------------|-----------------------------------|
| 21 | 0.998 0 | 0.997 955 5 |
| 22 | 0.997 8 | 0.997 773 5 |
| 23 | 0.997 5 | 0.997 541 5 |

Volume = (9.943 4 g)/(0.997 773 5 g/mL)
= 9.965 588 383 mL



Buoyancy Correction!!!



Buoyancy (Sec 2-3)

Buoyancy

- upward force exerted on an object by a liquid or gaseous fluid
- balance measures weight of sample plus weight of air
- sample and calibration mass may displace different amounts of air
- as air has mass, this can lead to error

If sample is less dense than calibration weight ($\rho < 8 \text{ g/mL}$), it will displace more air.
 \therefore sample will appear to weigh less than it actually does.

Density of water = 0.997 8 g/mL @ 22 C

Density of calibration weight = 8.0 g/mL

Density of air = 0.001 2 g/mL

$$m_{\text{true}} = m_{\text{obs}} \times 1.0011 \text{ (for water)}$$

$$m = \frac{m' \left(1 - \frac{d_a}{d_w} \right)}{\left(1 - \frac{d_a}{d_s} \right)}$$

Calculation:

$$\begin{array}{r} 34.141 \text{ 7 g} \\ - 24.198 \text{ 3 g} \\ \hline 9.943 \text{ 4 g} \end{array}$$

~~Volume = mass/density~~

Volume = $\frac{\text{mass} \cdot \text{buoy corr}}{\text{density}}$

| Temp. (C) | Lab man. Tab. III-2 density (g/mL) | Harris Tab. 2-7 density (g/mL) |
|-----------|---------------------------------------|-----------------------------------|
| 21 | 0.998 0 | 0.997 955 5 |
| 22 | 0.997 8 | 0.997 773 5 |
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$$\begin{aligned} \text{Volume} &= \frac{9.943 \text{ 4 g}}{0.997 \text{ 773 5 g/mL}} \\ &= 9.965 \text{ 588 383 mL} \end{aligned}$$

1. When weighing, if the weight is constantly drifting downwards::
 - a) you forgot to use finger cots.
 - b) the beaker is wet.
 - c) the beaker is hot.
 - d) the problem is static.

2. How many milliliters in total should be used to rinse a 10 mL pipet in three times?
 - a) 1 mL
 - b) 10 mL
 - c) 30 mL
 - d) all of your solution.

3. Which weighs more, a ton of feathers or a ton of bricks?
 - a) feathers
 - b) bricks
 - c) they weigh the same.