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1st year LMD, Specialty : Food industry technologies
Module : Analytical Tools for Chemistry, Biochemistry and Safety

VOLUMETRY (pipette, micropipette, ...)

To measure volumes of titrated liquids, gauged or graduated containers are used. The gauged containers are the vials and the pipettes ; the graduated containers are the burettes and the test tubes. In the case of burettes as in that of pipettes, the free surface of the liquid forms a meniscus. It is the lower part of the meniscus that must be used to locate the liquid level : **Fig 1** show that the meniscus must be tangent to the gauge line. However, with iodine or permanganate solutions that are strongly colored, we cannot distinguish the meniscus; the free surface di liquid seems horizontal, and it is she who is brought in coincidence with the gauge line (**Fig 2**).

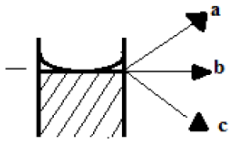


Figure 1

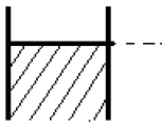


Figure 2

To adjust the flow of a pipette, the upper orifice is closed with the index finger: this is the only finger that allows precise adjustment. On the other hand, it must remain dry ; the wet finger hurts, and it is then impossible to adjust the air intake (**Fig 3**). The flow of a pipette is done in the open air ; you should never blow into it. When checking the meniscus outcrop, or when emptying the pipette, the tip of the pipette must always be pressed against the wall of the container **(Fig 4).** It must not form an air bubble on the walls of the container, which would lead to a significant source of error. The precise measurement of a volume is done between two graduations. Avoid measurements made between a graduation and the tip of the pipette.

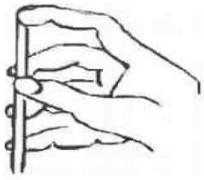


Figure 3

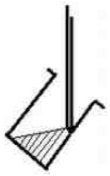


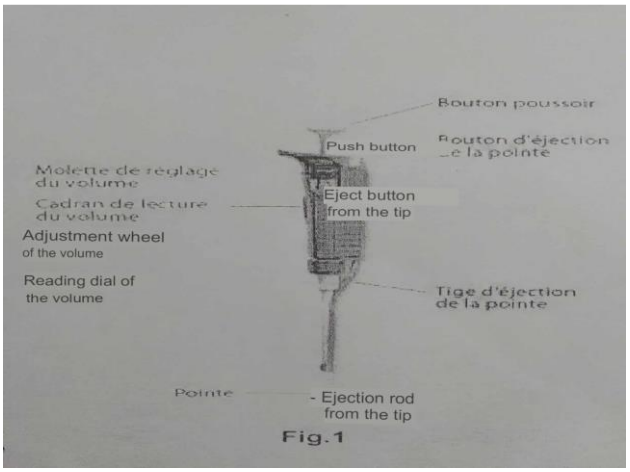
Figure 4

Reading of the burette and the pipette : beware of parallax errors ; on **Fig 1**, "a" and "b" the readings are wrong, "c" is correct.

B. USING THE MICROPIPETTE

1. Setting the pipette :

The volume taken by the pipette is indicated in the reading dial. To change the volume, turn the adjustment dial up to the indicated amount (**Fig 1**).



ATTENTION :

- Never turn the dial beyond the maximum amount supported by the pipette. Do not exceed 1000 pl with the P1000. Do not exceed 200 pl with the P200. Do not exceed 20 ul with the P20. Do not go below 0 (zero) with the setting (Fig.2).

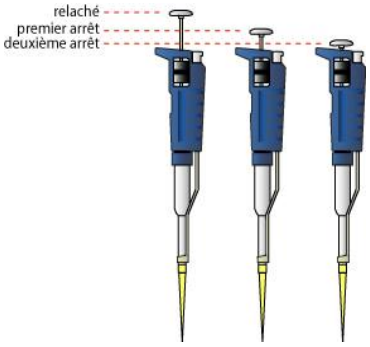
- Never pipette liquid without a tip at the end of the pipette. Never hold the pipette upside down (the tip at the top) in order to prevent liquid from damaging or contaminating the plunger. Change the tips between each pipetting so as not to contaminate the solutions. For those who are not used to pipetting, we recommend simply trying with water in order to master the operation of the pipette and get used to taking small volumes.

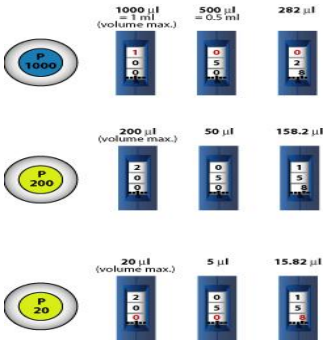
2. Using the push button (Fig 3) :

Three positions exist for the push button :

- Completely released (rest position).
- Pressed until the first stop.
- Pressed all the way down, until the second stop (allows you to completely empty the tip).

Let go
Premar stop
Second stop

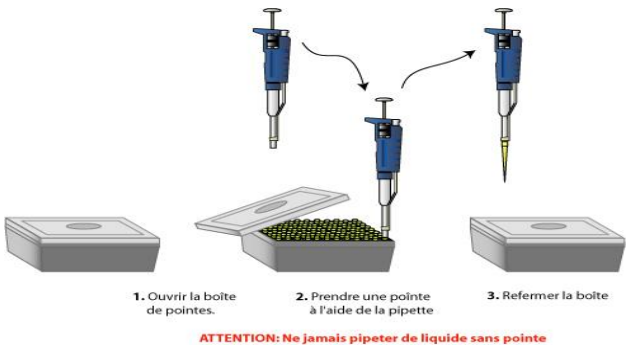




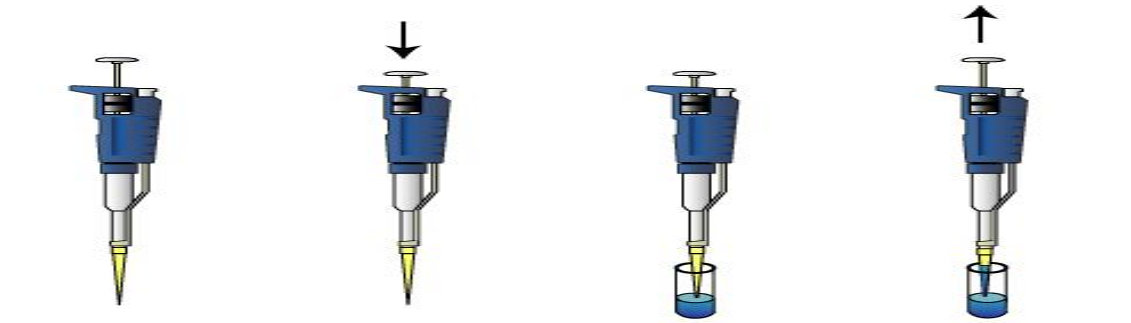
3. how to pipette ?

1) adjust the pipette to the desired volume as indicated above.

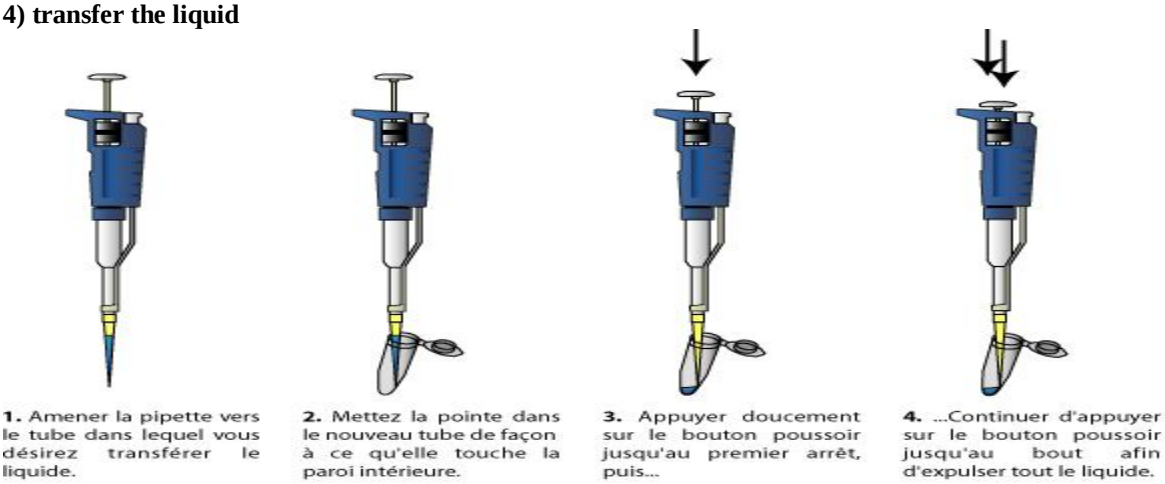
2) put a tip



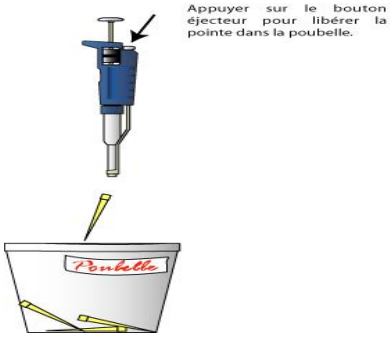
4. collect liquid



4) transfer the liquid



5) Eject tip



Useful link (video) : https://www.youtube.com/watch?v=JBsQm5kY22Y

1. Bring the pipette to the tube in which you dose transfer the liquid.

2. Put the tip in the new way tube until she touches the inner speech.

3. Press gently on the push button until the first stop, then....

4. ...Continue to press on the push button to the end in order to expel all the liquid.

4. How to release the pipetted liquid?

1. Adjust the pipette and put a spike.

2. Press down to the first atret.

3. Putting the extortion of the tip in the solution to be collected.

4. Release the piston gently

How to eject the tip?

Useful link (video): https://youtu.be/JBsQm5kY22Y