

University of Babylon / College of Pharmacy

Department of Pharmaceutical Chemistry/Analytical Chemistry

Lecture number - 2

Saturday – 26/11/2016

C- MEASURING VOLUME :- The precise measurement of volume is as important to many analytical methods as the precise measurement of mass.

C- 1 Units of VOLUME: is the liter (L).

The milliliter (mL) is one one-thousandth of a liter (0.001L).

The microliter (ML), 0.000001L, 0.001mL

C-2 Apparatus for Precisely measuring Volume.

Volume may be measured reliably with a pipet, a buret, or a volumetric flask.

Pipets

Pipets permit the transfer of accurately known volumes from one container to another

Common types are shown in Figure 2-17, and information concerning their use is

given in Table 2-2. A volumetric, or transfer, pipet (Figure 2-17a) delivers a single

Glassware types include Typical pipets

(a) volumetric pipet, (b) Mohr pipet

(c) serological pipet, (d) Eppendorf

micropipet, (e) Ostwald–Folin pipet

(f) lambda pipet

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fixed volume between 0.5 and 200 mL. Many such pipets are color coded by volume

for convenience in identification and sorting. Measuring pipets (Figure 2-17b and c)

are calibrated in convenient units to permit delivery of any volume up to a maximum

.capacity ranging from 0.1 to 25 mL

All volumetric and measuring pipets are first filled to a calibration mark, but the

manner in which the transfer is completed depends on the particular type. Because

most liquids are attracted to glass, a small amount of liquid tends to remain in the

tip after the pipet is emptied. This residual liquid is never blown out of a volumetric

pipet or from some measuring pipets, but it is blown out of other types of pipets (see

Table 2-2)

Handheld Eppendorf micropipets (see Figure 2-17d and Figure 2-18a) deliver

adjustable microliter volumes of liquid. With these pipets, a known and adjustable volume of air is displaced from the plastic disposable tip by depressing the

pushbutton on the top of the pipet to a first stop.

This button operates a springloaded piston that forces air out of the pipet.

Burets, like measuring pipets, make it possible to deliver any volume up to the maximum capacity of the device.

The precision attainable with a buret is substantially greater than the precision with a pipet.

A buret consists of a calibrated tube to hold titrant plus a valve which the flow of titrant is controlled. This valve is the arrangement by principal source of difference among burets.

Volumetric flasks (see Figure 2-20) are manufactured with capacities mL to 5 L and are usually calibrated to contain(TC) a ranging from specified volume when filled to a line etched on the neck. They are used and for the dilution of samples for the preparation of standard solutions to a fixed volume prior to taking aliquots with a pipet. Some are also two calibrated on a to-deliver(TD) basis, and they are distinguished by reference lines on the neck. If delivery of the stated volume is desired, the flask is filled to the upper line.