


Volume Measurement page

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Proportionate containers and more aids in chemical laboratory

At preparation solutions and liquid handling we use different laboratory containers and tools. The purpose for which is different they have been used, and accuracy. Compliance temperature is important because density liquids change with temperature.

Let's compare density clean water for different temperature: At a temperature of 4 °C contains one liter almost exactly one kilogram net water. With increasing temperature density decreases so that at 20 °C it is already two grams less and at a temperature of 37 °C weighs one liter clean water just about 993 grams^[1].

Proportionate the dishes are usually calibrated at 20 °C (in the USA 25 °C). Calibration the temperature is indicated on every proportionate container.

It is necessary have on memory that temperature many solutions during mixing changes - e.g. inorganic acids and alkalis are at dilution they heat, on the contrary many it is salted at dissolution cools down. At measuring and preparation such solutions so can unnoticed cry out significant error

Tools for measuring volume fluids

Aid	Usual range volume	Accuracy
Erlenmeyer flask, beaker	5-5000 ml	just indicative
Proportionate flask	5-2000 ml	high
Volumetric cylinder	5-2000 ml	medium
Burette	1-100 ml	high
Pasteur's pipette, dropper	1-5 ml	small
Glass pipette	1-100 ml	high
Automatic pipette	5-5000 µl	high
Automatically dispenser	0.1-100 ml	medium
Microsyringe	0.5-1000 µl	high
Piston valve dispenser	1-500 ml	medium

Beakers

They are used for orientation determination volumes liquids. Except gross measurement volumes serves beakers mainly for dissolution substances, dilution liquids, heating and others laboratory operations. For low accuracy measurement is usually between proportionate containers neither does not rank.

Proportionate flasks and volumetric flasks cylinders

Proportionate flasks and volumetric flasks cylinders are calibrated " to top up " , which is on them marked by mark D according to Czech refill or IN by of the English include. After refilling on relevant line has liquid inside containers exactly said volume . If we pour a liquid into another containers , certain amount will remain in form thin movie whose drops on walls , so I pour it over we will transfer smaller than marked volume .



Beaker

I usually hug given in milliliters . At measurement must vessel state on fixed , horizontal washers . Right the volume is measured if the meniscus liquids my own lower edge touches features on container . Proportionate cylinders serves only approximately _ measuring , measured flasks used for preparation solutions about exact concentration .

Burets , pipettes , dispensers and syringes

Burettes , pipettes , dispensers and syringes they measure out volume liquids taken to another containers .

Pipettes and burettes they are usually **calibrated " to pouring "** , mark **V** acc Czech pour out or **Ex** according to of the English exclude. Liquid from them leaked from relevant line has said volume . Content pipettes we do not blow , i when will remain in tip a drop With her by volume with calibration counts .



Measuring cylinder and measuring cup flask

▪ Burettes

They are used in titrations , or where repeatedly measures out same volume liquids . It is glass or plastic calibrated tube closed a cock . A burette is used holder will fasten vertically to stand . At closed tap carefully _ help funnels will fill relevant liquid . The funnel is removed and opened slightly the tap is released such amount liquid to make her bottom meniscus was touching features . Then there is the burette ready for titration . It is discharged with a cock titration reagent and its the volume is monitored on scale . To the most important actions at work with a burette belongs correctly deduction volume . The burette reads _ always twice . First at determination zero brands , the second time at subtraction discharged volume . As it is subtracted change volume , it doesn't matter too much on way subtraction . However, there always is for example subtract the same way .

File:Burets.jpg

Burets

IN routine laboratories are used automatic burettes .

▪ Glass pipettes

To measure volumes in modern routine laboratories are used already few and are replaced semi-automatic dispensers . Volume of glass pipettes can be different , from 1 to 100 ml. They can be either undivided , intended for measurement the only one volume , or divided - usually after milliliters and tenths milliliters . Scale can point from tips towards the top edges or on the contrary .

From security reasons never we don't suck solution into a pipette mouths - used to stretch different types attachments or pistons .




Glass pipettes

Attachment for pipettes

At suction can not be pipette leaning against the bottom containers . Before measuring sample with a pipette first will fill solution and removed the volume is discharged into the waste containers . Only then it is removed exact volume and transfers it to the container for the next one processing . Solution can not never enter the pipette extensions .

▪ Automatic pipettes (pipettes , micropipettes , microdispensers)

One of the options measurement small ones volumes is use automatic pipettes.

 For more information see Automatic pipettes .



Microdosers

▪ Microsyringes

Used for accurate dosage small ones amount (0.1–1000 & μ l) of liquids . They consist of a needle attached to glass cylinder with a scale in which it moves piston . Individually types vary _ diameters needles and pistons .



Microsyringe

▪ **Piston valve dispensers**

They are formed by a piston with a scale that is fitted on stock bottle . They enable repeatedly dosage certain volume liquids that stock bottles . Dispensers intended for dosing aggressive chemicals (e.g. strong _ acids) have glass parts made of borosilicate glass , plastic parts which _ they are in contact with liquid they are made of PTFE, others parts they are made of PE or PP. In modern types of dispensers is dosage automated help controls modules .

File:Red
dispenser.jpg
Piston valve
dispenser

Automatic pipettes

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