TDC Part III

Practical (Lab Work)

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TOPIC:- Glassware for measuring

Glassware for measuring

A. Graduated cylinder

The graduated cylinder is used to measure a semi-precise volume of liquid (Figure 1.14). While it is not as precise as volumetric glassware, it is much more accurate and precise than a beaker or flask (to within 1%). Volumes are measured to the bottom of the meniscus for aqueous solutions and the top of the meniscus for non-aqueous hydrophobic solutions. Graduated cylinders are general-use pieces of "To Deliver (TD)" glassware, where the delivery volume is important. Higher levels of accuracy require volumetric glassware.

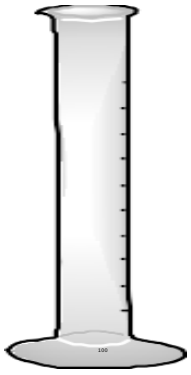

Figure 1.14 Graduated cylinder

B. Volumetric glassware

I. Volumetric flask

Volumetric flasks are used for making standardized (high precision) solutions, where precision is known to four significant figures (Figure 1.15). Since volumes are not necessarily additive, the volumetric flask is used to make solutions of precise volumes. The etched mark on the neck of the glassware signifies the volume to high precision at the specified temperature. A solution is prepared by adding enough solvent to dissolve the solute, and then the solute is added and dissolved. The solution is then diluted to the mark using the solvent. The solution is mixed throughout the dilution process and sometimes requires being placed in an ice bath in the case of exothermic dissolution (typically strong acids or bases). Volumetric flasks range in size from 1 mL to 4,000 mL and larger.

Figure 1.15 Volumetric flask

II. Pipettes

Volumetric pipettes are known for high precision, like volumetric flasks, but are used to dispense liquids, typically in the preparation of solutions in a volumetric flask (Figure 1.16). The pipette also has an etched mark denoting a precise volume, and the solution is drawn into the pipette using a pipette bulb, never by mouth.

Figure 1.16 Volumetric pipette

III. Micropipettes

Micropipettes are a specialized class of volumetric pipettes used for very small volumes from 1 µl to 1,000 µL. The micropipette uses plastic disposable tips, but these can be re-used under appropriate situations (Figure 1.17). Most micropipettes have an adjustable range of volumes using separate withdraw and dispense actions on the pipette body. The mechanism for adjusting, determining volume limits, and ejecting disposable tips varies by manufacturer.

Figure 1.17 Micropipette

IV. Burettes

The burette is an analytical piece of glassware used to dispense variable (but precise) volumes of liquids (Figure 1.18). Commonly found in analytical chemistry, this burette is used in a variety of titration experiments.

Figure 1.18 Burette