



Solution-Pharmacy

# Basic Apparatus/Glassware Used in Pharmacy laboratory

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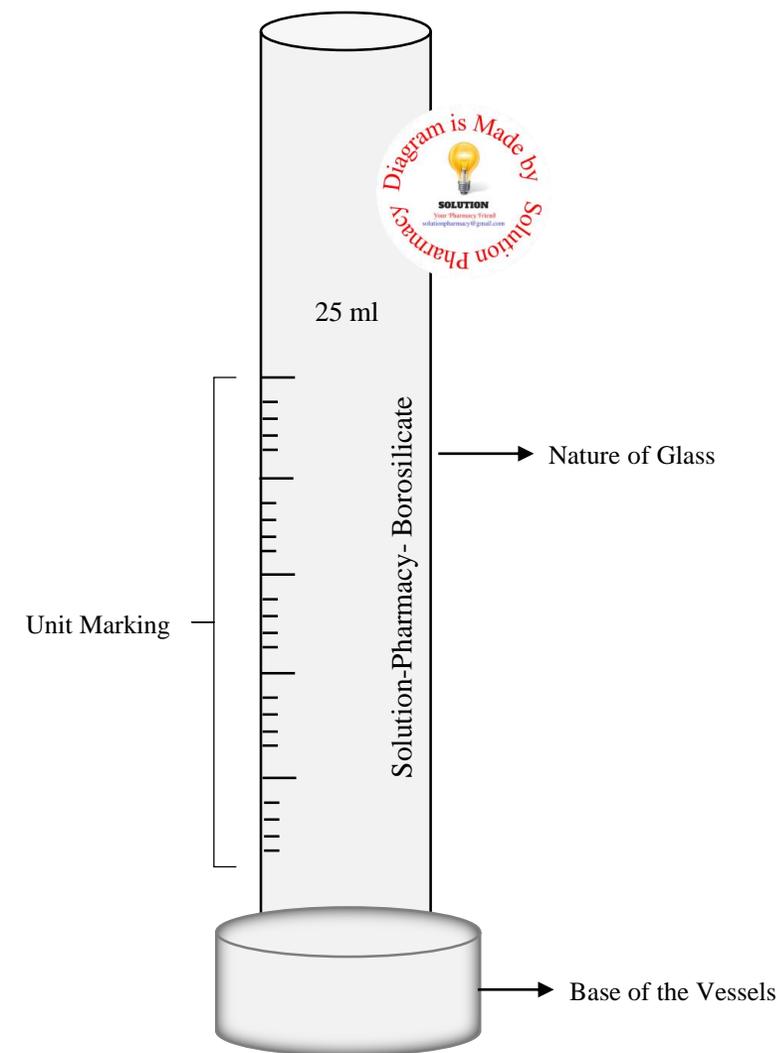
# Measuring Cylinder

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A **graduated cylinder** also known as a **measuring cylinder** is one of the most common piece of laboratory glassware which is used to **measure** the volume of liquids or we can say that it is used to accurately **measure** the volume of chemicals for various laboratory purposes. Measuring cylinder can be used in any of laboratory like- Pharmaceuticals, Pharmacognosy, Medicinal or general chemistry along with HAP Laboratory.

Graduated cylinders are also used to determine **displacement**, which is a measurement of the change in a volume of water when additional materials are added to it. This means that the volume of solid objects and **non-aqueous** (lacking water) solutions can be determined using a graduated cylinder. Example- Swelling Index determination



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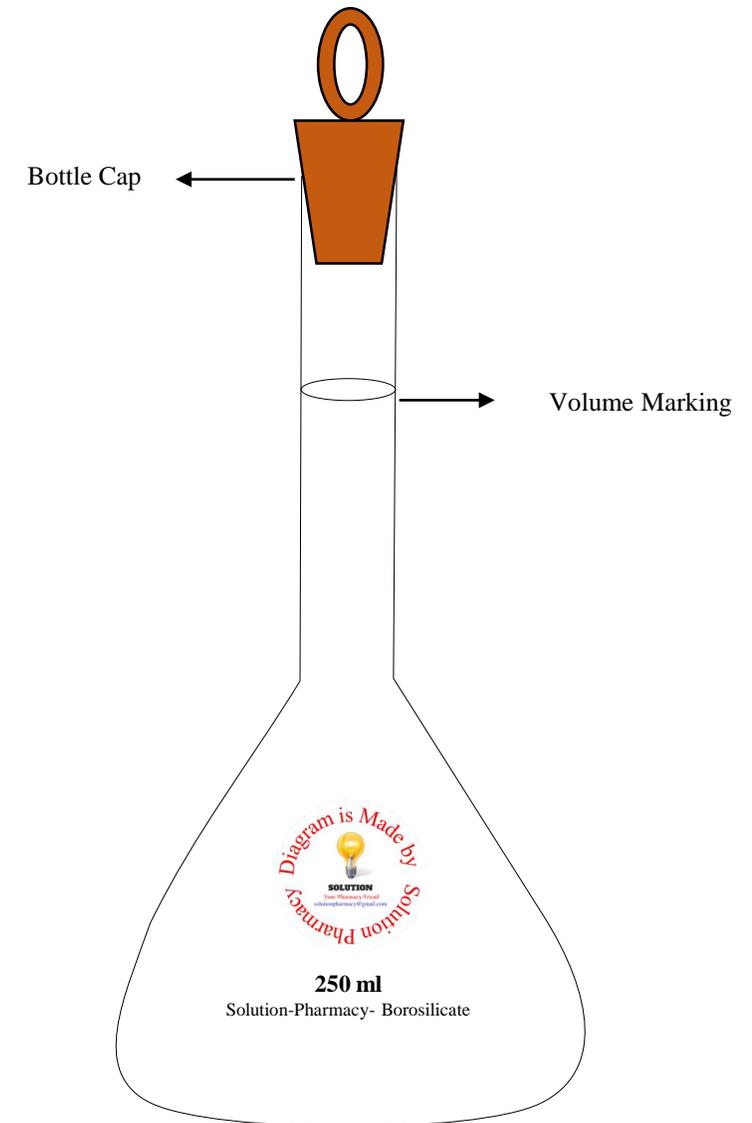
# Volumetric Flask

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A **volumetric flask** (measuring **flask** or graduated **flask**) is a piece of laboratory glassware, a type of laboratory **flask**, calibrated to contain a precise volume at a particular temperature. **Volumetric flasks** are **used** for precise dilutions and preparation of standard solutions. These have mark on their neck, which let us measure exact volume of any sample or liquid.

The volumetric flask is used for measuring accurate volumes of liquid materials for laboratory experiments. They are favored when available because they are more accurate than graduated cylinders and beakers, which are other pieces of equipment that are used to measure liquids. Volumetric flasks are important when precision is a factor in the outcome of the experimentation



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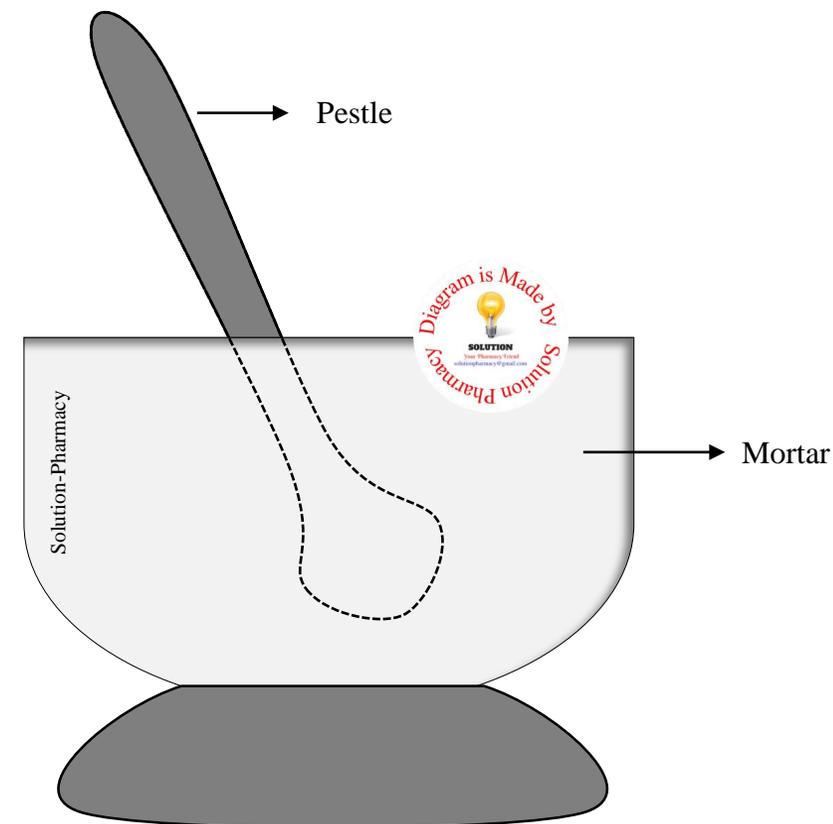
# Mortar-Pestle

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**Mortar** and **pestle** are the basic apparatus available in every pharmaceutical laboratory specially in pharmacognosy department, these are used to crush and make a pest of any given sample. These are being used since ancient times to prepare ingredients or substances by crushing and grinding them into a fine paste or powder in the kitchen, medicine and pharmacy.

A **mortar** is a vessel in which substances are ground or crushed with a pestle. A **pestle** is a tool used to crush, mash or grind materials in a mortar. In solid state chemistry a mortar and pestle is often used to prepare reactants for a solid state synthesis (the ceramic method).The glass Pestle and mortar is also available.



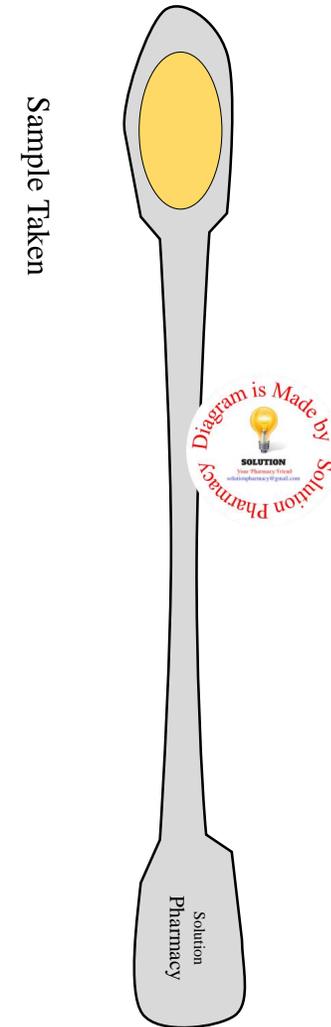
# Spatula

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Spatula are nothing but a scientific spoon, which is used for taking sample in a small quantity or to transfer the reagent to be weighed. In **laboratories**, **spatulas** and micro spatulas are small stainless steel utensils, used for scraping, transferring, or applying powders and paste like chemicals or treatments. Many **spatula** brands are also resistant to acids, bases, heat, and solvents, which make them ideal for **use** with a wide range of compound.

With blades and handles of varying width and lengths, you will find these **steel spatulas** are perfect for most laboratory applications. Chemically inert and manufactured with smooth, flat surfaces, our spatulas deliver performance, economy and reliability.



Sample Taken

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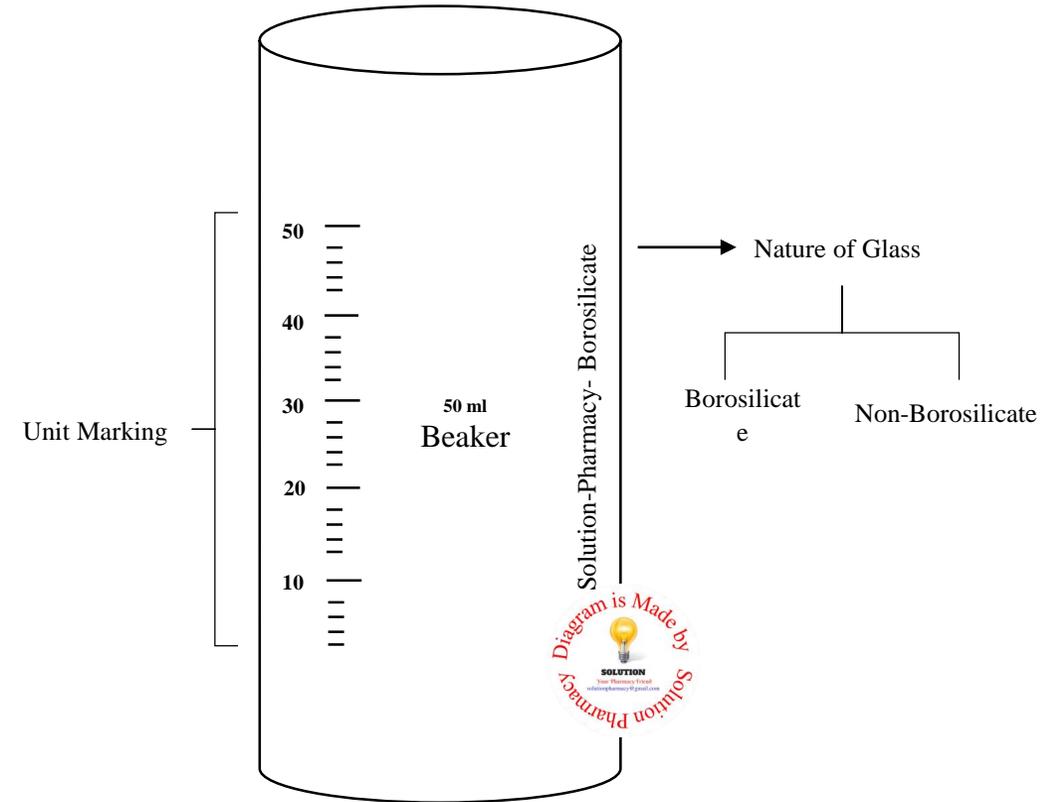
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# Beaker

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Beakers are one of the multi-functionary laboratory equipment used for various purposes in a lab. At the most basic, it holds samples to be used later. Apart from that they can also be used for preserving small chemical reaction. Beakers are made up of tempered glass and have wide mouth for pouring the solutions easily. Any experiment which yields a liquid product uses beaker to catch the liquid. Beakers are also used for experiments like chromatography. Because of their optimum balance between thermal resistance and mechanical strength due to controlled wall thickness at sides, radius and bottom, they are widely used in research, industry and education. For heating purpose borosilicate beakers are used.



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# Conical Flask

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Conical flask are another widely used glass ware in any of science laboratories. These are made up of pyrex or other borosilicate glass, a conical flask can be used for heating and cooling liquids without much risk of cracking. Often a solution is made up by adding a solid to a liquid in a conical flask, and sometimes heating it. A magnetic stirrer can be added to keep the mixture swirling.

Since the neck is narrow and the body is wide, there is less tendency for liquids to splash out of the top when swirling, compared to a beaker. This is great if there are strong acids or bases in it. The narrow neck also makes a conical flask easier to pick up than a large beaker. This can be used for mixing any sample easily as compare to beaker, also used in titration.



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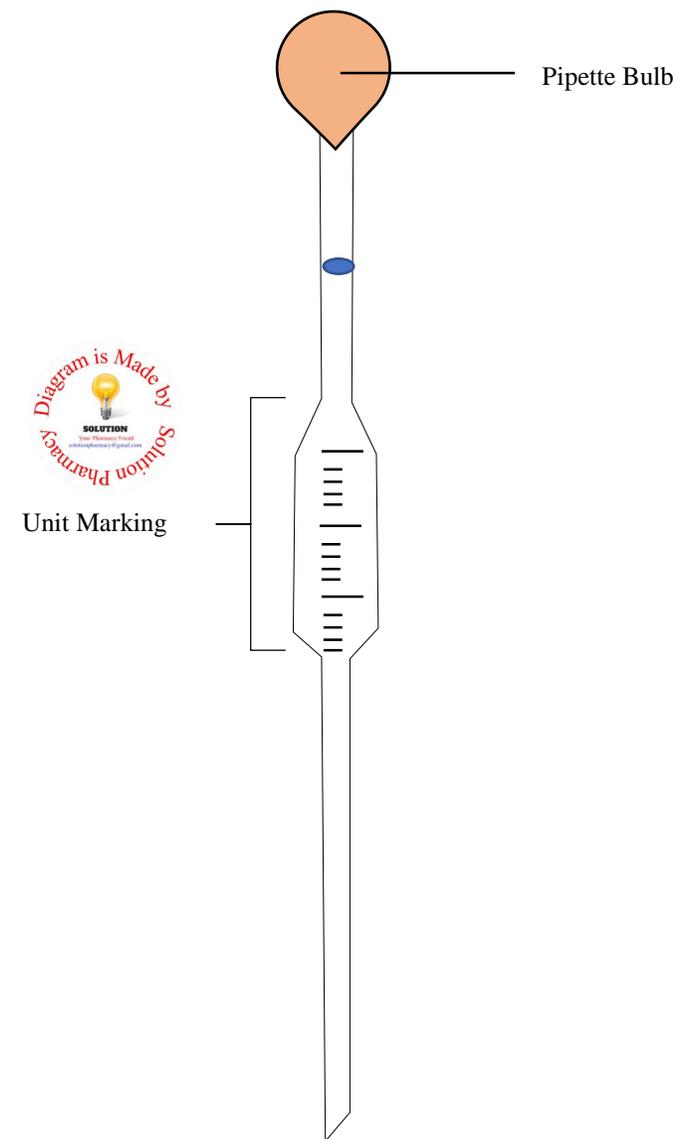
# Volumetric Pipette

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Pipettes, also called pipets or chemical droppers, are small tubes of glass or plastic used to transfer a measurable amount of liquid from one container to another. They come in two forms: volumetric pipettes, used to transfer a single specific volume of liquid, and measuring pipettes, used to transfer varying, measured volumes. Pipettes in their current form appeared in the 1970s, to replace the old and dangerous practice of mouth pipetting, where scientists would transfer liquids in the lab using straws and suction from their own mouths, regardless of potential hazards. Pipettes are very useful and easily in handling, if any small quantity of liquid is to be transferred then these pipette should be used to maintain the specificity and accuracy.

Example- In titration, In making solution of specific normality.



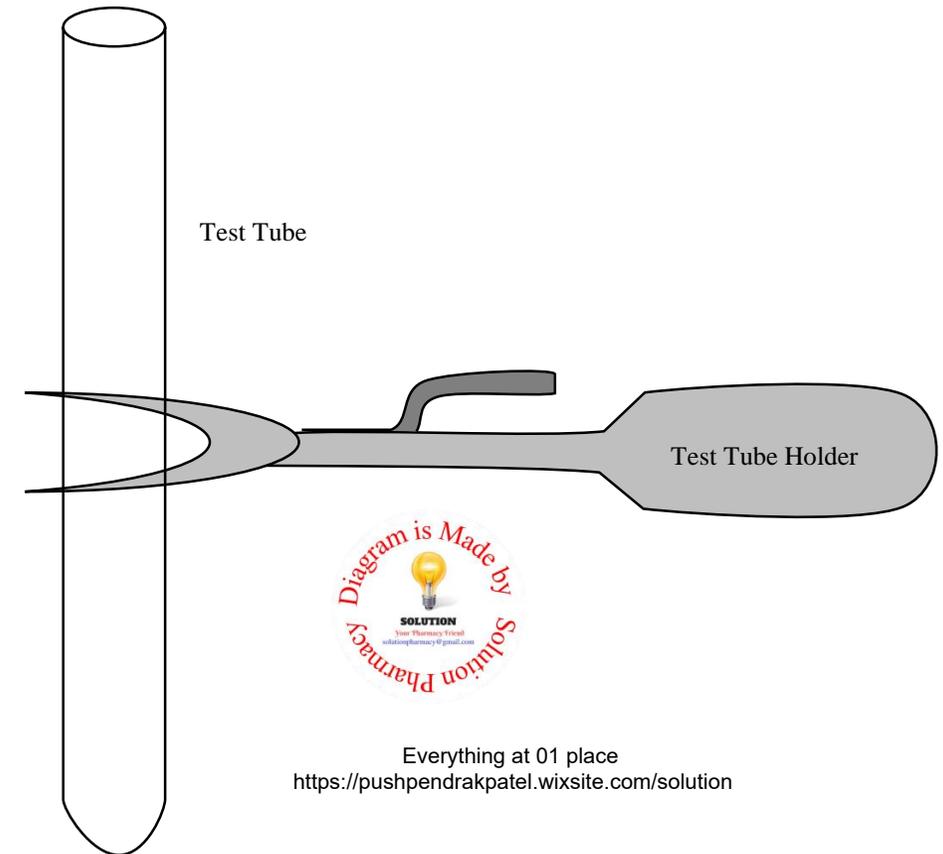
# Test Tube & Holder

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Every science students is very familiar with this small but powerful glass ware. As name indicate test tube is a tube which is used to test something. A **test tube** is a clear glass or plastic container that is much longer than it is wide, commonly has a U-shaped bottom, and has an open top. **Test tubes** are **used** to hold, mix, and heat chemical experiments. They are **used** as homes for microorganisms when people want to culture (grow) them.

A test tube holder is used to hold Test Tubes. It is used for holding a test tube in place when the tube is hot or should not be touched. For example, a test tube holder can be used to hold a test tube while it is being heated



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# Burette with Stand

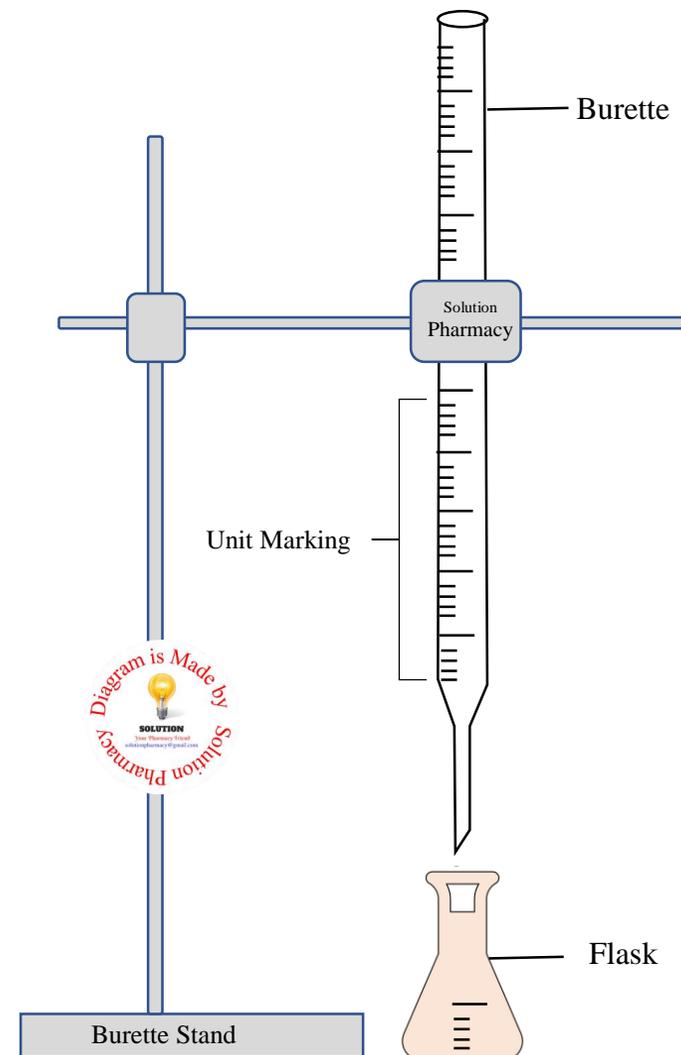
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**Burette**, also spelled **Buret**, laboratory apparatus used in quantitative chemical analysis to measure the volume of a liquid or a gas. It consists of a graduated glass tube with a stopcock (turning plug, or spigot) at one end. On a liquid burette, the stopcock is at the bottom, and the precise volume of the liquid dispensed can be determined by reading the graduations marked on the glass tube at the liquid level before and after dispensing it

A titration is a technique where a solution of known concentration is used to determine the concentration of an unknown solution. The process of acid-base titration involve acid, base and indicator. Burette is mostly used in chemistry lab, to find the amount of solution used.

Example- Determination of partition coefficient.



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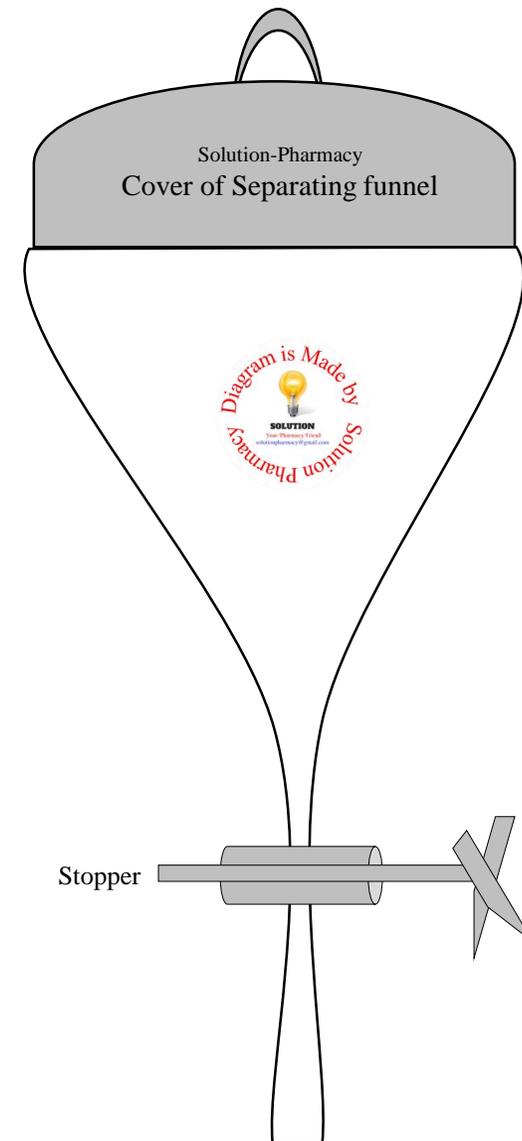
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# Separating Funnel

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A **separatory funnel**, is a piece of laboratory glassware used in liquid-liquid extractions to separate the components of a mixture into two immiscible solvent phases of different densities. Typically, one of the phases will be aqueous, and the other a lipophilic organic solvent such as ether MTBE dichloromethane chloroform or ethyl acetate. All of these solvents form a clear delineation between the two liquids. The more dense liquid, typically the aqueous phase unless the organic phase is halogenated sinks and can be drained out through a valve away from the less dense liquid, which remains in the separatory funnel. Separatory funnels can be used for liquid-liquid extractions. Two liquids that do dissolve well in each other can be separated using this funnel based on unequal densities. A mixture of oil and water, for instance, can be separated using this technique.



# Iodine Flask

## Basic Apparatus/Glassware Used in Pharmacy laboratory

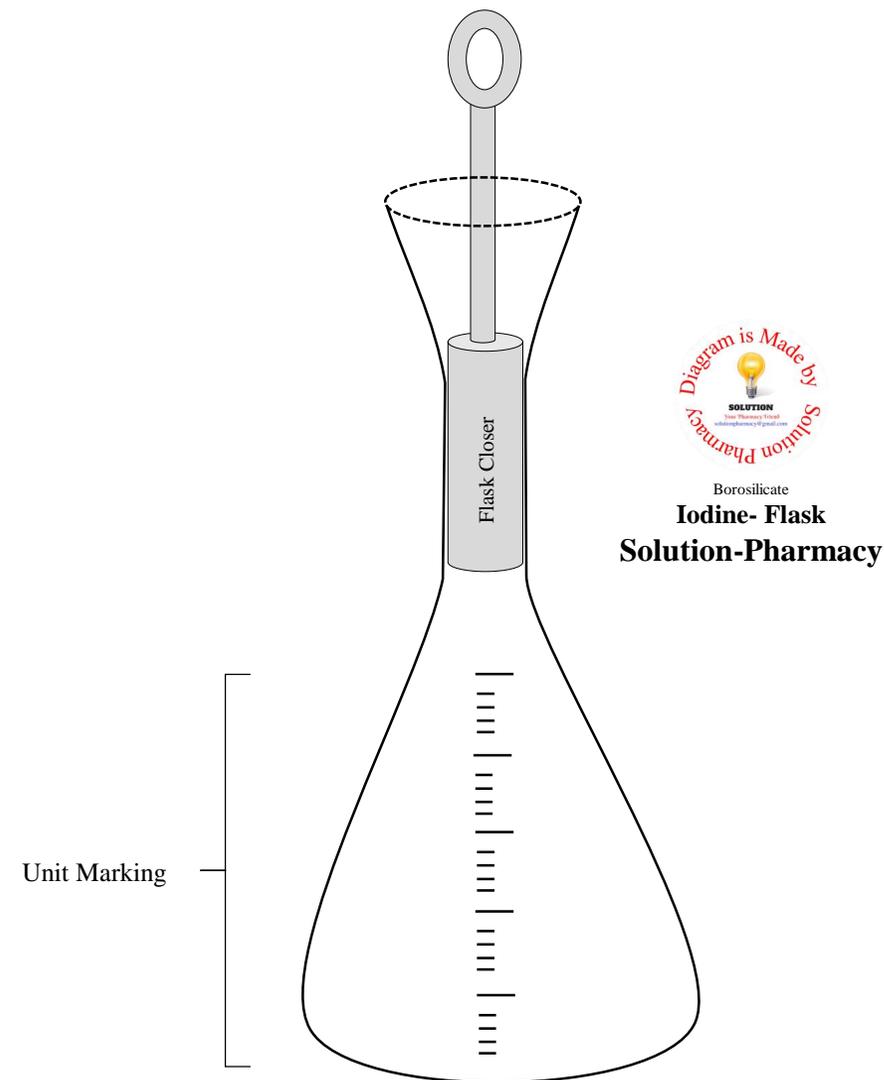
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An iodine flask is essential an Erlenmeyer flask with a stopper used for the wet chemical analysis "Iodine Determination". This analysis is typically performed on fatty acids, oils and shellac varnishes. Iodine flask bottle for determination if iodine with ground joint and stopper These glass flask iodine are made from borosilicate glass. Borosilicate glass is known for having very low coefficients of thermal expansion which making them resistant to thermal shocks more so than any other common glasses. All glass Flask iodine come with thick uniform wall thickness and are printed with white enamel. Iodine flask are basically used in the chemistry lab for estimation of iodine content or assay of iodine.

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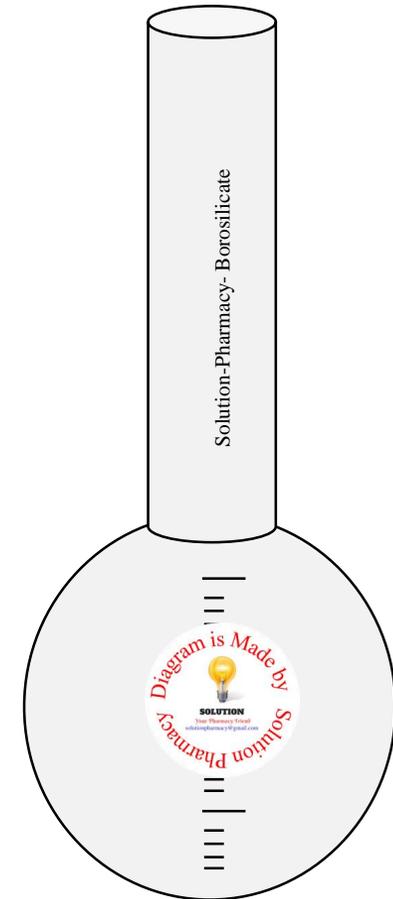
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# Round Bottom Flask

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This flask shape is also more resistant to fracturing under **vacuum**, as a sphere more evenly distributes stress across its surface. Round-bottom flasks are often used to contain chemical reactions run by chemists, especially for reflux set-ups and laboratory-scale synthesis. **Round-bottom flasks** are types of flasks having spherical bottoms used as laboratory glassware, mostly for chemical or biochemical work. They are typically made of glass for chemical inertness and in modern days, they are usually made of heat-resistant borosilicate glass. There is at least one tubular section known as the neck with an opening at the tip. Two or three-necked flasks are common as well. Round bottom flasks come in many sizes, from 5 mL to 20 L, with the sizes usually inscribed on the glass. In pilot plants even larger flasks are encountered. Example- Distillation and Extraction process.



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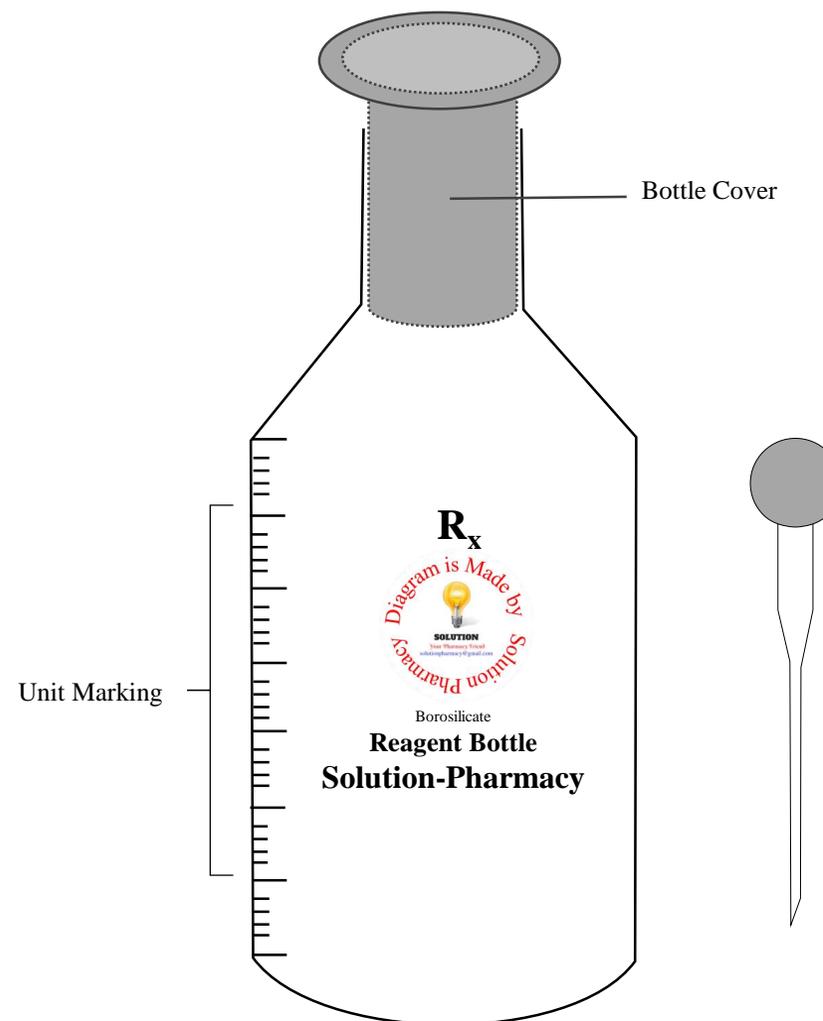
# Reagent Bottle

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As the name indicate reagent bottles are the bottles or vessels which are used to keep the prepared reagent for various use in laboratory. The reagent bottle is a special container for various liquids and solid reagents in the laboratory. The shape of the reagent bottle is mainly divided into narrow mouth and wide mouth. Since reagent bottles are only used for normal temperature storage reagents, they are usually made of sodium calcium plain glass. In order to ensure a certain strength, the bottle wall is generally thicker. Reagent bottle is divided into narrow mouth or wide mouth, clear or amber, and with stopper or without stopper. Among them, glass stopper, no matter small mouth, wide mouth, should have inside ground sand processing craft. Example- Keeping the Ninhydrin solution for chromatography.

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# Media Bottle

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Microbiology is the branch of science which basically involve the study of microorganism long with their suitable and harmful use. And to use microorganism or to make their culture we need media. Media is a vital nutrients for the optimum growth of microorganism. Media bottle are the highly specified bottles for the storage of media. Media may be specific for any microorganism colony, so the media thus prepared must be free from any other kind of microbes. These media bottle are very helpful to protect the possible contamination. Media bottles are made of special glass materials like- Pyrex and others. The media bottle should be highly sterilized and there should not be any other microorganism, so that there will be a possibility to acchive selective colony of microorganism.



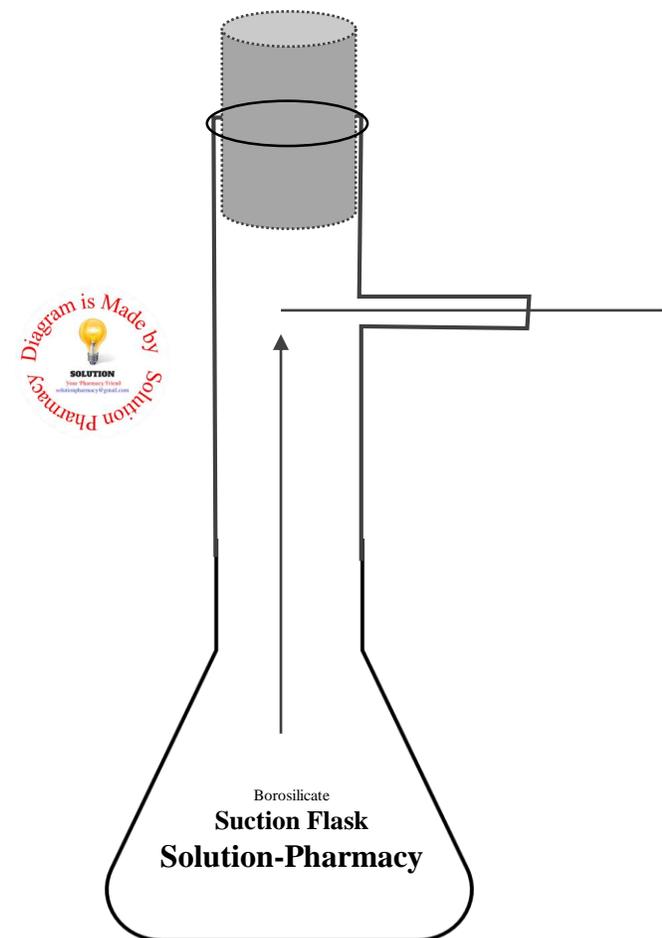
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# Suction Flask

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There are many solution which require filtration wither before the experiment or after the completion of experiments, but many extract or solution are so thick that they can not be filtered through normal filter paper as they make the filtration process so slow, to overcome this difficulty we use vacuumed system and for that we use suction flask. Commonly this is used in filtering processes involving vacuum filtration, often with a Buchner funnel or crucible funnel. The inlet may be connected to a vacuum source, such as a water aspirator. It is also known as **Suction flask**. This is used along with the Buchner funnel. The **Büchner funnel** is one device used for pressure assisted filtration. A vacuum in the flask underneath the filter allows atmospheric pressure on the liquid/solid mix to force the liquid through the filter paper.



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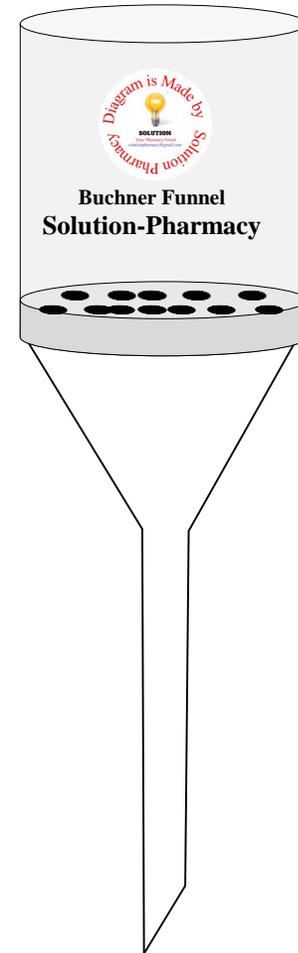
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# Buchner Funnel

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There are so many sample or solution which require filtration, and that become too difficult if that takes time, to overcome this problem we use suction funnel long with Buchner funnel. The **Buchner funnel** is one device used for pressure assisted filtration. A vacuum in the flask underneath the filter allows atmospheric pressure on the liquid/solid mix to force the liquid through the filter paper. Removing unwanted solid from liquid is the basic function of a Büchner funnel. The mixture of the liquid and solid is passed through the filter, which also has a piece of filter paper in the funnel, acting as a filtering agent. It blocks the solid particles, and the remains are passed into the collecting flask. These funnels are made from a variety of materials like porcelain, plastic or glass. Though porcelain sets are used primarily, other sets made from plastic or glass are also used. Example- Isolation of caffeine from tea leaves.



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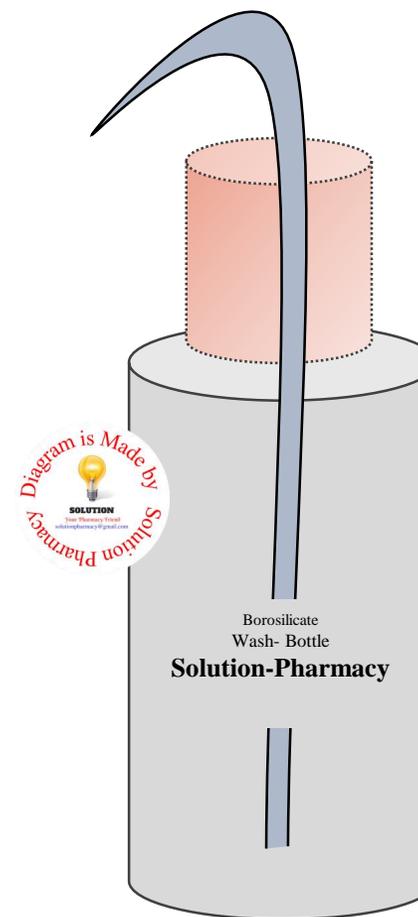
## Wash-Bottle

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As name indicate it is a bottle which is used for the washing of any assembly. For example there is need to wash the test tube after each transfer process and in case of pharmacology it is used to rinse the PSS (Physiological salt solution) tube to avoid any mixing or dose variations. **wash bottle** is a squeeze bottle with a nozzle used to rinse various pieces of laboratory glassware, such as test tubes and round bottom flasks. Wash bottle are very basic and easily available in every science laboratory. The care should be taken that it should not be excessively pressed,

Wash bottles are sealed with a screw-top lid. When hand pressure is applied to the bottle, the liquid inside becomes pressurized and is forced out of the nozzle into a narrow stream of liquid. a bottle or flask with a bent tube through its cap or stopper that is used to direct a stream of water onto something to be washed or rinsed.



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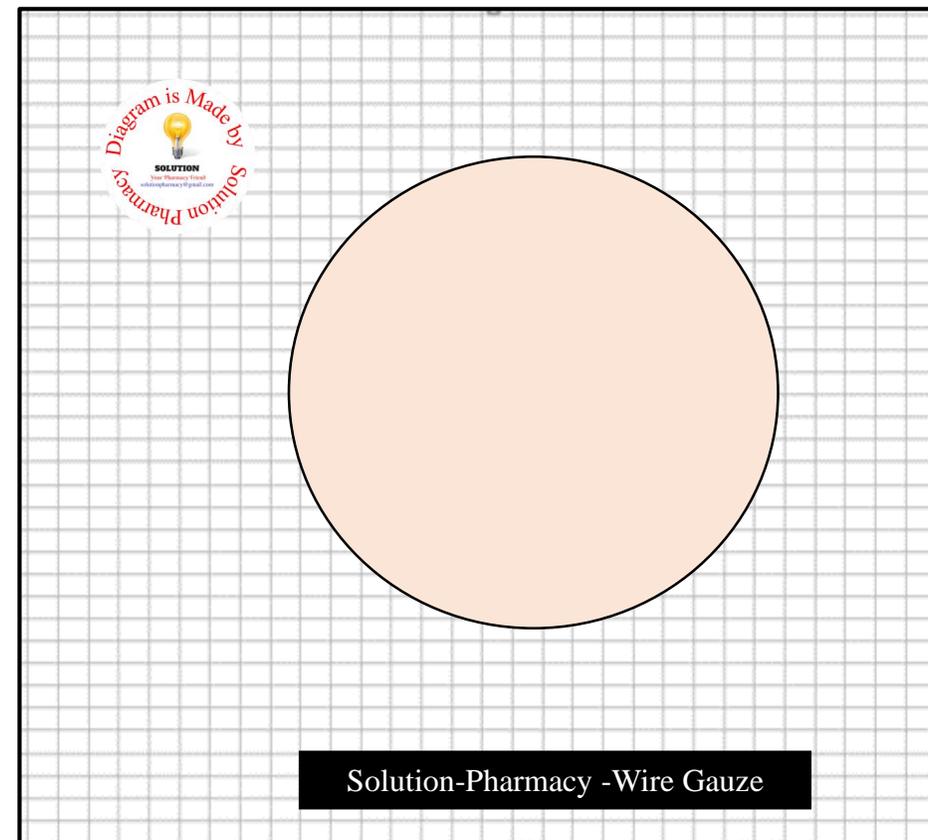
# Wire-Gauze

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A **Wire gauze** is a sheet of thin metal that has net-like crosses or a **wire mesh**. The purpose of **wire gauze** is to be placed on the support ring that is attached to the ring stand between the Bunsen burner and the beakers to support the beakers or other glassware or flasks during heating. Wire gauze is placed on the support ring that is attached to the retort stand between the Bunsen burner and the glassware to support the beakers, flasks or other glassware during heating.

Wire gauze works best when the glassware has a flat bottom (*e.g.*, beakers, Erlenmeyer flasks) or partially flat bottom (*e.g.*, Florence flasks). To see how to heat round-bottom glassware such as retorts and distilling flasks



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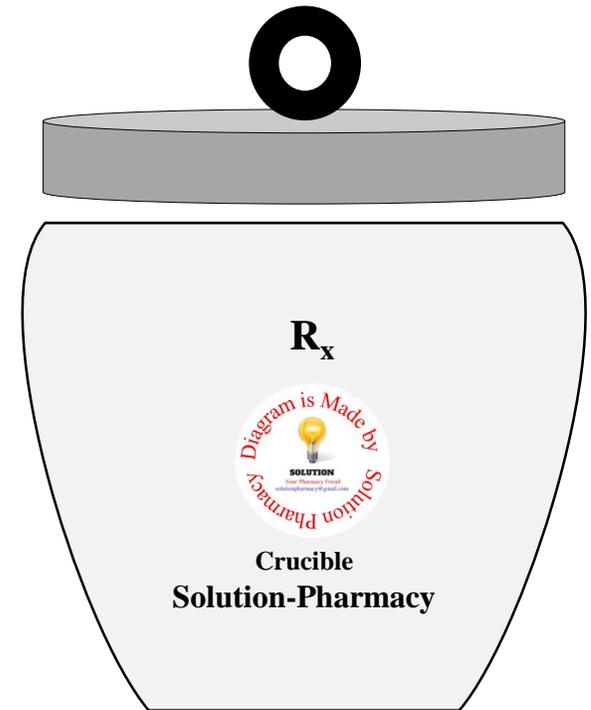
# Crucible

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A crucible is a pot that is used to keep metals for melting in a furnace. Furnace crucibles are designed to withstand the highest temperatures encountered in the metal casting works. The crucible should essentially be made of materials with a much higher melting point than that of the materials to be melted. The crucible materials should also have good strength even when extremely hot.

Furnace crucibles come in a variety of metal constructions, such as clay-graphite, silicon-carbide, and more. These materials can resist the extreme temperatures in typical foundry operations. Silicon carbide has the additional benefit of being a highly durable material. Some common shapes for crucibles include “A” shape and bilge shape. Example- Determination of Ash Value of any given crude drug.



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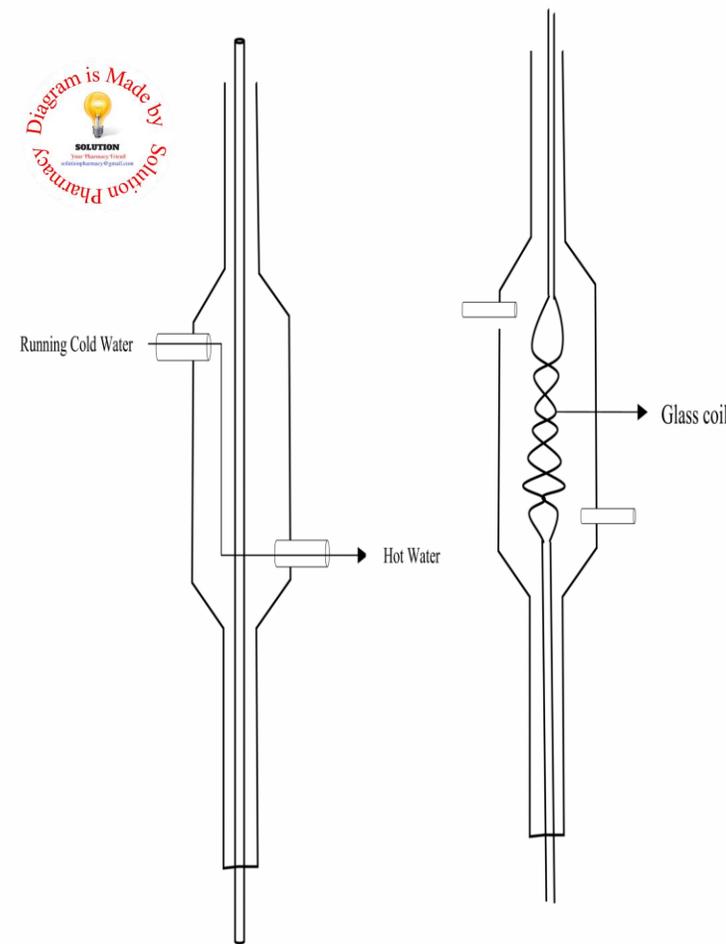
# Condenser

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Distillation is a process in which any liquid mixture (Solution) is boiled according to their boiling point and then the vapors are passed through condenser which are having flowing cold water. Condensers are used to condense vapors to liquid and are most commonly used for refluxes and distillation. There are a large number of different designs of condensers, some are designed to be suitable for a variety of purposes whereas others are very specialized. Predominantly condensers are designed to use water as the cooling source, or can use a coolant which is circulated through a chiller (and may allow temperatures lower than tap water would normally be). Alternatively there are condensers which can use other coolants, such as dry ice or liquid nitrogen, where significant cooling is required. Example- Volatile oil extraction.

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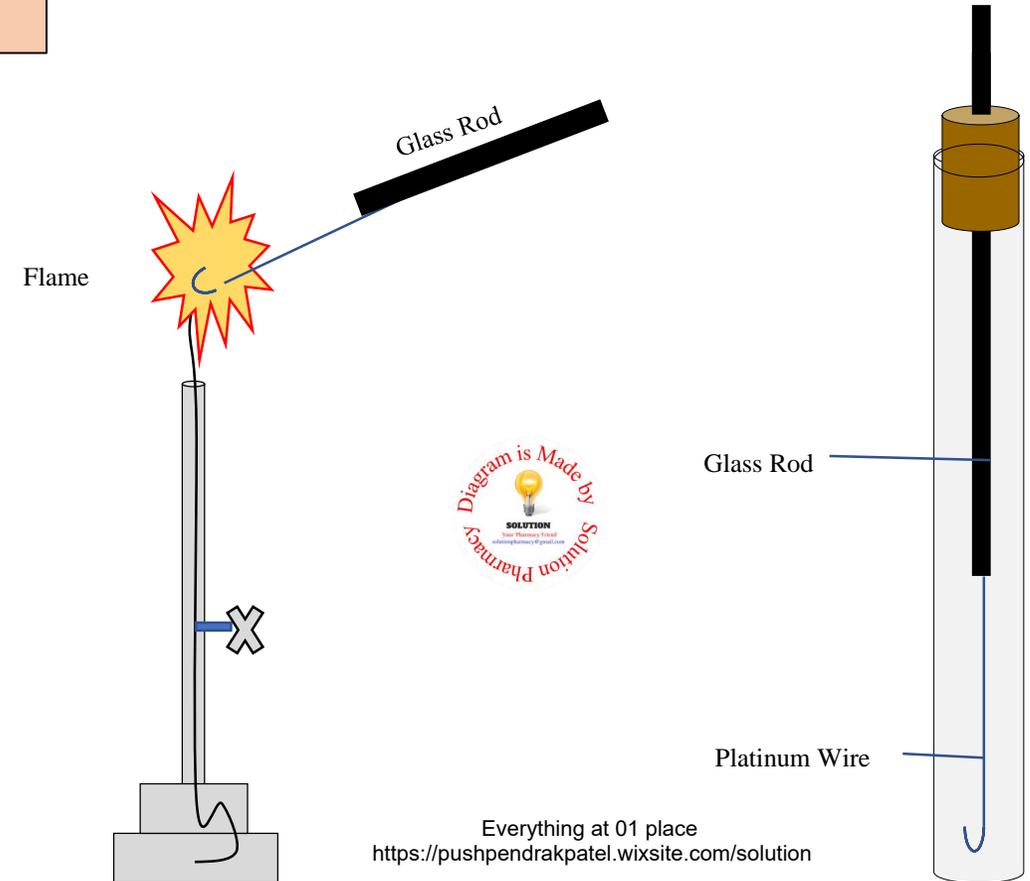
# Platinum Loop

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To perform the **flame test**: The classic technique is to use a clean wire **loop** made out of **platinum** or nickel- chromium (nichrome) wire, dip the **loop** into the powder or solution to be **tested**, and then placed into the hottest portion of a **flame**.

The classic technique is to use a clean wire loop made out of platinum or nickel chromium (nichrome) wire, dip the loop into the powder or solution to be tested, and then placed into the hottest portion of a flame. The resulting color of the flame is observed and this may be an indication of the presence of a particular ion.



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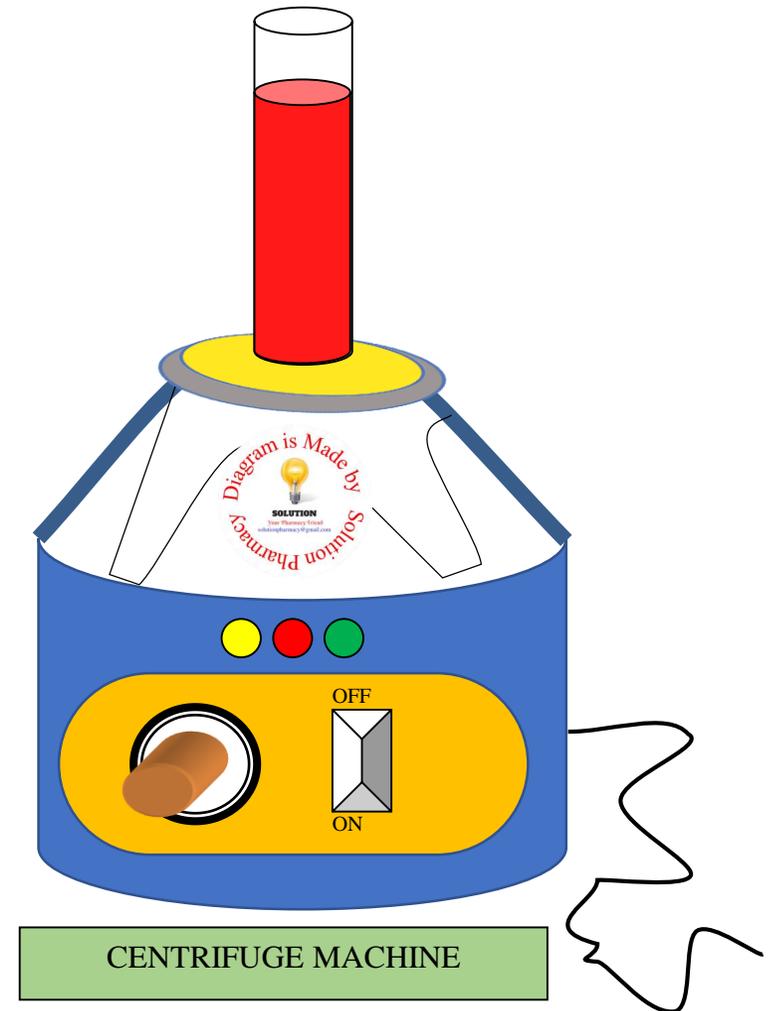
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# Centrifuge

## Basic Apparatus/Glassware Used in Pharmacy laboratory

This study material contain a short description about the glass wares and apparatus along with their images, which are made by Solution-Pharmacy.

A centrifuge is a laboratory device that is used for the separation of fluids, gas or liquid, based on density. Separation is achieved by spinning a vessel containing material at high speed; the centrifugal force pushes heavier materials to the outside of the vessel. This apparatus is found in most laboratories from academic to clinical to research and used to purify cells, subcellular organelles, viruses, proteins, and nucleic acids. There are multiple types of centrifuge, which can be classified by intended use or by rotor design. From the large floor variety to the micro-centrifuge, there are many varieties available for the researcher.



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# Petri dish and Watch Glass

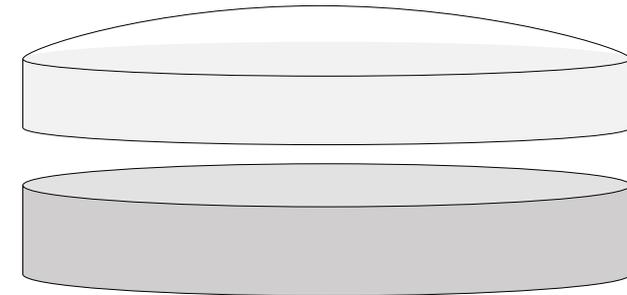
## Basic Apparatus/Glassware Used in Pharmacy laboratory

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Petri dish is a shallow glass or plastic flat bottomed dish with a lid. Used primarily in laboratories for the culture of bacteria and other microorganisms on specially prepared media. It was named after the German bacteriologist Julius Richard Petri (1852-1921) who invented it in 1877. Petri dish is very useful glass ware in almost every laboratory but it is widely used in the microbiology lab. Petri dish are used for the culture formation of any specific microorganism. The media is prepared by pouring the media into this petri dish. Petri dish comes in glass and plastic along with their respective cover. Petri dish used in microbiology are disposable and used only once.

A **watch glass** is a circular concave piece of **glass** used in **chemistry** as a surface to evaporate a liquid, to hold solids while being weighed, for heating a small amount of substance and as a cover for a beaker. Example- For slide preparation and staining of any section cutting.

Petri Dish and Cover



# Reagent spraying bottle

## Basic Apparatus/Glassware Used in Pharmacy laboratory

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We have already seen the reagent bottle. But the reagent spraying bottle is some how different from reagent bottle as it is used to spray the reagent on the surface of any object. For example in the process of chromatography a R<sub>f</sub> value is determined by spraying visualizing agent through this spraying bottle. This **bottle** can be **used** with all chemicals, even chemicals that cause standard trigger **sprayers** to fail and fall apart. The nozzle O-ring and piston cup of the trigger **sprayer** is made of Viton for superior **chemical** resistance. The adjustable nozzle **sprays** from a fine mist to a jet stream.

These bottle are also used in the evaluation of anti asthmatic agents in histamine chamber. This bottles are either made of glass having hand push method or now a days the these are coming like a aerosol container.



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# Funnel

## Basic Apparatus/Glassware Used in Pharmacy laboratory

This study material contain a short description about the glass wares and apparatus along with their images, which are made by Solution-Pharmacy.

A **funnel** is a pipe with a wide (often conical) mouth and a narrow stem. It is used to channel liquid or fine-grained substances into containers with a small opening. Without a **funnel**, spillage may occur. **Funnels** are usually made of stainless steel, aluminum, glass, or plastic.

Glass funnels can be used to guard against spillage when pouring chemicals from one vessel to another, and they can also be fitted with a filter to separate solids from liquids. Separatory funnels are also used for filtration and extraction, having a bulb-shaped enclosed body fitted with a stopper on top to prevent spillage when the funnel is inverted, along with a stopcock at the spout's base, which can be used to gradually lower the bulb's internal pressure.



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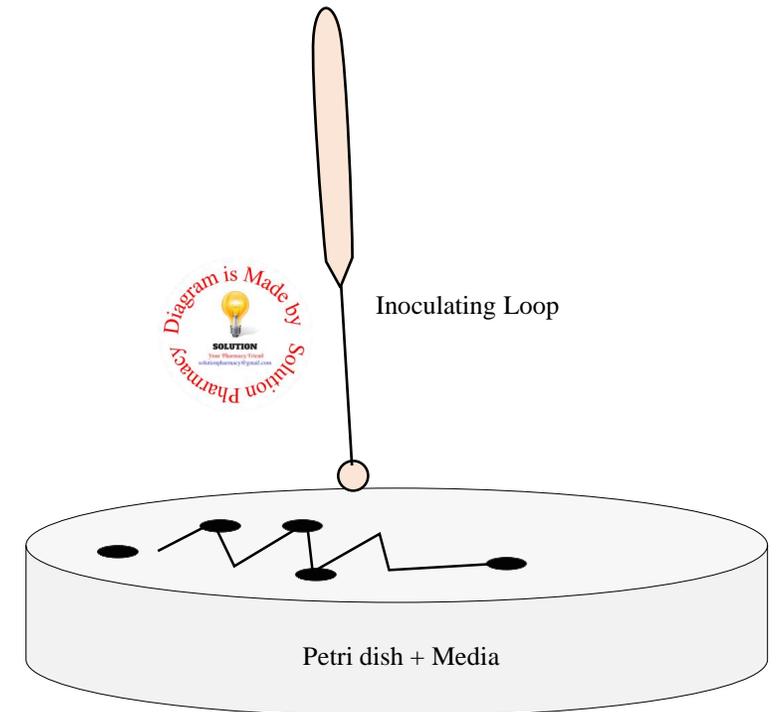
# Inoculating Loop

## Basic Apparatus/Glassware Used in Pharmacy laboratory

This study material contain a short description about the glass wares and apparatus along with their images, which are made by Solution-Pharmacy.

The main use of inoculating loop is in microbiology laboratory. Inoculation loop are the small device which are used to transfer the microorganism from one plate to the other. The loop should be highly sterilized and free from any o the undesirable or foreign microorganism that why it is placed under the flame to kill all unnecessary microbes. From the colony of microbes any specific sample is taken and then transferred to the another petri dish in a zic-zac way. These are made up of highly stainless materials and of very thin wire mesh.

An **inoculation loop**, also called a smear **loop**, **inoculation** wand or micro streaked, is a simple tool **used** mainly by **microbiologists** to retrieve an inoculum from a culture of microorganisms. The **loop** is **used** in the cultivation of microbes on plates by transferring inoculum for streaking.

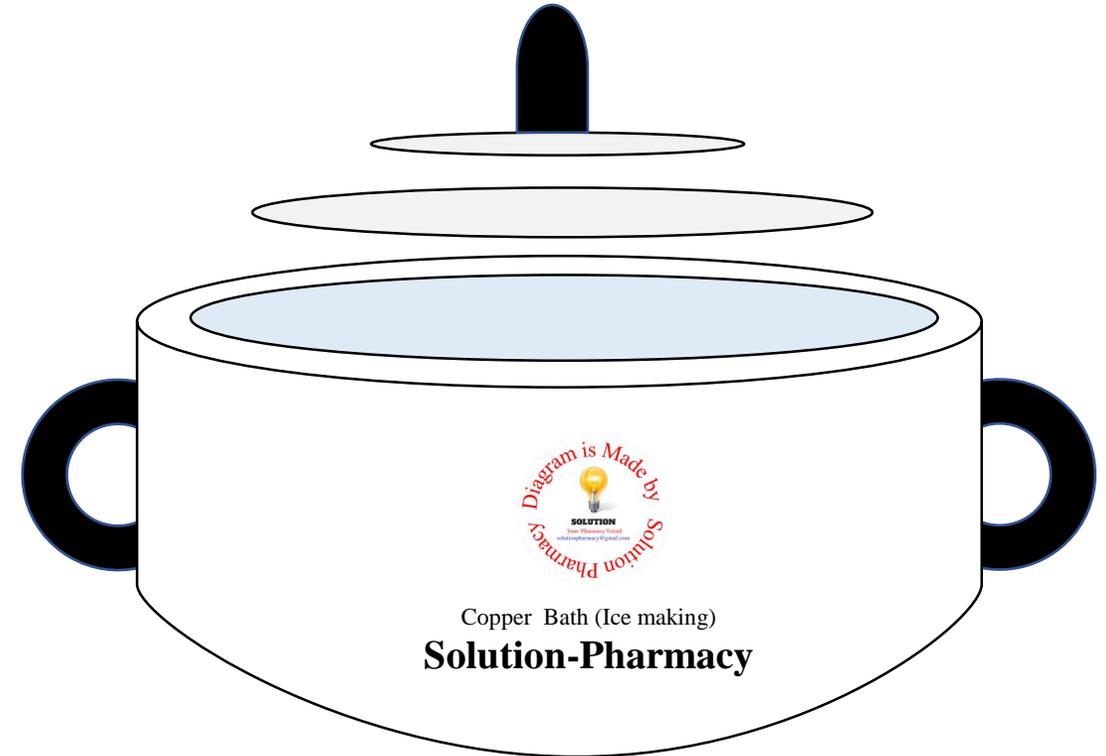


# Inoculating Loop

## Basic Apparatus/Glassware Used in Pharmacy laboratory

This study material contain a short description about the glass wares and apparatus along with their images, which are made by Solution-Pharmacy.

A **water bath** is laboratory equipment made from a container filled with heated water. It is used to incubate samples in water at a constant temperature over a long period of time. Utilizations include warming of reagents, melting of substrates or incubation of cell cultures. It is also used to enable certain chemical reactions to occur at high temperature. Water bath is a preferred heat source for heating flammable chemicals instead of an open flame to prevent ignition. Different types of water baths are used depending on application. Water bath is having various layers of covering to allow specific rate of steam escaping. Water bath is one of the basic apparatus available in chemistry lab. Example- in synthesis of various intermediate.



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