

Science Education Collection

# Introduction to Serological Pipettes and Pipettors

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## Abstract

The serological pipette is frequently used in the laboratory for transferring milliliter volumes of liquid, from less than 1 ml to up to 50 ml. The pipettes can be sterile, plastic, and disposable or sterilizable, glass and reusable. Both kinds of pipettes use a pipet-aid, for the aspiration and dispensation of liquids. Different sizes of pipettes can be used with the same pipet-aid for a variety of experimental assays. For example, serological pipettes are useful for mixing chemical solutions or cell suspensions, transferring liquids between receptacles, or carefully layering reagents of different densities. With careful attention to the level of liquid being aspirated and dispensed, serological pipettes can be useful tools for transferring accurate milliliter volumes of solutions in the lab. This video discusses the way that volume can be read on a serological pipette, how a pipet aid works, and many different applications for using a serological pipette.

## Transcript

The serological pipette is a nearly ubiquitous laboratory instrument used for transferring milliliter volumes of liquid. Serological pipettes typically have gradations along their sides for measuring the amount of liquid being aspirated or dispensed.

These instruments are most commonly used with a pipette dispenser, which facilitates the liquid transfer through the creation of a partial vacuum. The same pipette dispenser can be used with a variety of serological pipette sizes, depending on the amount of volume you wish to transfer.

Serological pipettes are typically either plastic, sterile, and disposable or glass, sterilizable and reusable.

All serological pipettes require the use of a pipette dispenser for the transfer of liquids.

The pipette dispenser negates the need for a researcher to perform the ancient technique of mouth pipetting. This primitive method for transferring liquids is not recommended, as it can lead to liquid entering the oral cavity and causing some serious adverse side effects.

One type of dispenser, The pipette bulb offers the least amount of accuracy and is generally used with glass serological pipettes to transfer non-specific volumes of liquid.

The pipette pump is also used with glass pipettes and allows a more precise regulation of the liquid volume. Pipette pumps are particularly useful for dispensing repeat volumes of solution.

The pipet-aid is the most common type of pipette dispenser. It is made up of several key components: the nose cone is where the pipette attaches and is also where the filter – which protects the inside of the pipet-aid from liquid and maintains sterility - is located.

On the handle of the pipet-aid two triggers can be found; the top trigger is depressed for aspirating liquids, the bottom for dispensing.

Often pipet-aids will come equipped with settings that control the speed with which liquid is dispensed. For example, the instrument can be set to dispense liquid using forced air, in a blow-out setting, and with no force, in a gravity setting.

Although some pipet-aids have cords, most are battery-powered.

Some pipet-aids are equipped with a stand that attaches to the handle, allowing the pipet-aid to rest on its side without having to remove the pipette.

As mentioned, different sizes of serological pipettes can be used with the same pipette dispenser depending on the volume of liquid being transferred, from as little as a tenth of a milliliter up to tens of milliliters.

First, select the pipette of the proper size for the volume you wish to transfer. Then open its wrapper at the top, and handling the pipette only above the gradation marks, attach it to the dispenser before removing the rest of the wrapper.

Next, holding the pipette dispenser in one hand, remove the cap of the liquid you wish to aspirate. Then, keeping the pipette vertical, gently depress the top trigger to slowly aspirate your sample.

Use the gradation marks along the side of the pipette for measuring the volume you will transfer. Note that the volume is read at the gradation along the bottom of the meniscus, not at the top of the liquid.

Now without touching the tip of the pipette against any non-sterile surfaces, carefully dispense the liquid into your selected receptacle.

Be careful to use gentle pressure when aspirating liquids, particularly when using smaller volume serological pipettes to avoid contaminating the filter and sample or damaging the pipet-aid. Failure to use care when operating a pipet-aid will greatly anger more experienced members of the lab who may need to disassemble and repair this instrument. When aspirating larger volumes and when dispensing, a firmer pressure can be used on the trigger for a faster transfer of the solution.

Finally, be sure to dispose of the pipette properly after you are finished transferring the liquid.

Now that you know how to operate a serological pipette, let's take a closer look at some common laboratory applications.

Evenly distributing cells throughout a solution is an important step when plating or culturing cells. Use a serological pipettes for gentle and effective mixing of cell suspensions, as well as for mixing chemical solutions and reagents.

After isolation or treatment of experimental cell cultures, serological pipettes can be useful for transferring entire colonies of cells for expansion or further experimental analysis.

Another common use for serological pipettes is the careful layering of reagents for the creation of density gradients like a ficoll gradient, which is used to purify cells from blood plasma.

You've just watched JoVE introduction to serological pipettes.

In this video we reviewed: what a serological pipette is and when it's used, how a pipet-aid helps to aspirate and dispense milliliter volumes of liquid, and some different applications of your serological pipette. Thanks for watching and please remember the dangers, of mouth pipetting!