Choose the Right Syringe for your pump

You may learn that:

- What is a syringe? What can you do with them in the laboratory?
- What materials are the syringes made of?
- What are the parts of a syringe?
- What kinds of Terminations are there? Which to choose when using a syringe pump?
- Why is it so important to choose the right type of syringe?
- How to accurately transport fluids?
- How to make sure choosing the right syringe for the experiment?

INTRODUCTION

- Syringes are critical tools in laboratories in fields like medicine, chemistry, biology, and pharmaceuticals. They help researchers to accurately control and measure the volumes.

- Syringes can be used for different purposes, from precise sample preparation to precise liquid processing and chromatographic analysis.

- Syringes can be used in the laboratories manually or with instruments, like syringe pumps.

- There are different types and sizes of syringes on the market, and it is crucial to determine which type of syringe is most suitable for a specific experiment to ensure repeatability and avoid accidents, contamination, and experimental errors.

Well, you may think, "Come on, man, it's just syringe, right?" But in fact, my dear researchers, syringes are unsung heroes, seems inconspicuous but actually essential tools in most biology or chemistry laboratories. Finding the appropriate syringe for the experiment can sometimes be a headache, whether to used manually or with an syringe pump.

I believe you' ve been also wondering which type of syringe to choose for a specific purpose, especially when dealing with hazardous chemicals or high-pressure experiment. There are multiple types of syringes, each designed for different applications.

So now, let's have a glance in the world of laboratory syringes from a scientific perspective. But right before delving into the details, let's learn about some basic knowledge about syringes first.

WHAT'S A SYRINGE? WHAT CAN YOU DO WITH IT IN THE LABS?

Syringes are multifunctional experimental tools with multiple applications in various scientific disciplines like chemistry, biology, materials science, environmental science, fluid mechanics, medicine, and etc. Every day, in many laboratories, syringes are used for transferring and measuring liquids and gases. In the laboratory, you can use a syringe for a lot of tasks, such as:

- Injecting drugs into lab animals
- Dispensing liquids, lubricants, or greases
- Add reagents and solvents for chemical reactions
- Transferring DNA sample into sequencing gel for electrophoresis
- Cell culture for medium exchange, cell counting, or reagent addition

Syringes are also used in chromatographic techniques, including gas chromatography (GC) and high-performance liquid chromatography (HPLC). They are used for sample injection, where precise liquid transport is crucial for the accuracy of analysis.

However, regardless of the application involved, researchers have to choose the appropriate type of syringe carefully when working with syringe pumps or using syringes manually.

WHAT MATERIALS ARE THE SYRINGES MADE OF?

Next, let's talk about the material of the syringe. Syringes are mainly made of plastic, glass, or stainless steel. It is crucial to know the material composition of the syringe (such as polycarbonate, glass), the type of syringe plunger (such as rubber, PTFE, metal), and the needle or tubing used for fluid delivery in order to evaluate the material compatibility of the syringe with specific chemicals (such as solvents, acids, bases, etc.).

Plastic syringe: This kind of syringe is made of PP or PE and is usually disposable, so there is no need to worry about cross contamination. This is pretty important, especially when dealing with toxic and harmful media. Always remember, SAFETY FIRST! When you need inert and non-reactive syringes, plastic syringes are your best choice. Although this disposable syringe is only suitable for certain applications, it is often a more cost-effective option for many laboratory applications. The capacity range of the syringe is 1mL to 150mL.

Technical Parameters

Name	Model No.	Material	Suitable Product
Plastic Syringe	1.0ml	Barrel material: PP Seal plug: Rubber	SPLab series, ISPLab series, ZU-I(SPC, SPM)
	2.0ml		
	5.0ml		
	10ml		
	20ml		
	30ml		
	50ml		
	100ml		SPLab series, ISPLab series
	150ml		

Glass syringes: they may seem more delicate and prone to damage, but they do have some critical advantages. The glass syringe can be reused, with excellent chemical resistance and heat shock resistance, making it suitable for handling organic and inorganic chemicals (excluding hydrofluoric acid). When you need to deliver a small amount of liquid, such as in gas chromatography and low-dose sample injection applications, micro glass syringes are unparalleled in their applications. The process of injecting samples into the gas chromatograph can be manual or automatic, but no matter in which case, a micro glass syringe is needed to inject the sample.The volume error is relatively smaller, and it can even handle nano upgrade capacities ranging from 500nL to 5000nL. The large size glass syringes also have multiple kinds of terminations, such as Luer lock or Internal Thread, to adapt to various applications. The size range is between 250uL to 100mL. Compared to plastic syringes, glass syringes are also much more expensive.

Technical Parameters

Name	Model No.	Material	Suitable Product
Gastight glass syringe with Internal thread	250µl	Barrel material: Borosilicate glass; Plunger rod material: Stainless steel; Plunger seal material: PTFE	SPLab-G1 ISP60Lab-G1 ZU-I-G1(SPC, SPM)
	500µl		
	1.0ml		
	2.5ml		
	5ml		
	10ml		
	25ml		
	50ml		SPLab-G2 ISP60Lab-G2 ZU-I-G2(SPC, SPM)
	100ml		

Stainless steel syringes: They're usually used to transfer some viscous liquids, while the ordinary glass or plastic syringes have no choice to handle them, and they may burst under high pressure or temperature. This is where stainless steel syringes come in handy. When dealing with corrosive liquids or requiring high-pressure dosing applications, stainless steel syringes will be the correct ones. Stainless steel syringes have high resistance and are also resistant to high temperatures. This type of syringe is usually larger in size, durable, but much more expensive, and not as easy to use as other materials of syringes because they are opaque, making it more difficult to extract liquid and remove bubbles.

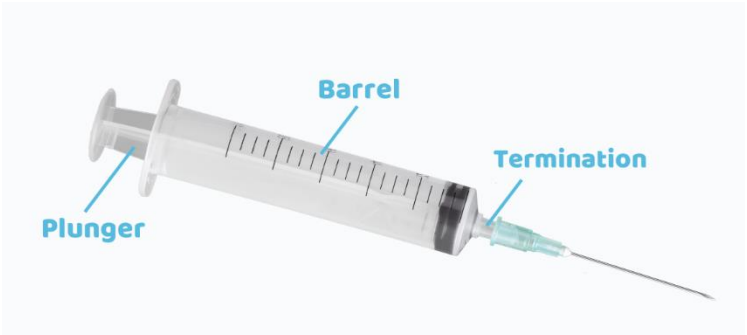
WHAT ARE THE PARTS OF A SYRINGE?

Now, let's take a look at the composition of the syringe. Generally speaking, a syringe consists of three main parts: barrel, plunger, and termination.

Barrel: It is a cylindrical chamber used to hold the liquid to be injected or extracted, with a scale marked on it. Usually, the cylinder is transparent and the amount of liquid inside can be seen; But in some photosensitive applications, opaque syringes may also be used. The syringe is the main body of a syringe equipped with a piston. As is well known, syringes are divided into different sizes, and the scale unit on the syringe can be milliliters (mL) or microliters (μL) , depending on the size of the syringe. For accuracy, the minimum dispensing volume of a syringe should be greater than or equal to 10% of its total capacity, which means that if you've got a 10 μL syringe, the minimum amount of liquid you can handle with it will be then 1 μL.

Plunger: It is the part that can move freely up and down inside the barrel, creating a vacuum to draw in or push it out through the tip. Some glass syringes have interchangeable barrels and plungers, ensuring safety and also increasing cost-effectiveness.

Termination: It is located at the end of the barrel and connects the syringe to different needles or connectors. For a wide range of applications, there are various terminations and needle options, especially for glass syringes. Many syringes are supplied and used with needles attached, but other terminations are also available, which is helpful when working with syringe pumps. The needle can be fixed into the glass syringe barrel or removable.



WHAT KINDS OF TERMINATIONS ARE THERE? WHICH TYPE TO CHOOSE WHEN USING A SYRINGE PUMP?

Firstly, let's take a look at Luer rotary lock. This is a common interface where you can find their traces anywhere from hospitals to laboratories. Due to their secure screw on connection structure, they have incredible versatility. You can connect subcutaneous injection needles, adapters, pipelines, or valves. After rotating and locking the joint in place, there is no need to worry about accidental detachment. This effectively ensures safety and stability.

In addition, there are also Luer sliding locks or inline connector. This is most commonly used in laboratories and medical fields, and very suitable for subcutaneous or intramuscular injection administration. You just need to insert the needle interface onto the syringe, and due to the presence of friction, it can remain fixed. It is pretty easy to install and disassemble as needed. But please remember, it does not have a locking function like the Luer rotary lock. Therefore, if you are dealing with dangerous or viscous liquids, or using them under high pressure, it won't be a good choice.

Sometimes, it is necessary to use a syringe pump to transfer liquid, but it must be ensured that there is no air in the flow path. At this point, a bubble free prime (BFP) syringe will be needed. In a regular syringe, there is an annoying gap between the end of the syringe and the valve, which is stored for about 50μL of air. But for BFP type syringes, this problem no longer exists. It uses a conical plunger tip to pass through the threaded joint all the way into the valve, expelling every bubble in the flow path.

In conclusion, for general applications, a regular plastic syringe with attached needle is sufficient; But when large amount of liquid, viscous liquid or gas being transfered, Luer lock joints or threaded joints may be the best choice to connect glass syringes to pipes. Regarding terminations, please also feel free to consult our technical service personnel.

WHY IS IT SO IMPORTANT TO CHOOSE THE RIGHT TYPE OF SYRINGE?

Let me tell you this, using a wrong syringe can lead to various problems. Here we are talking about accidents, pollution, and data errors. Besides, it will be difficult for you to replicate the same experiment if you choose the wrong syringe.

HOW TO ACCURATELY TRANSFER FLUIDS?

In terms of precise handling of liquids, syringe pumps can definitely be considered the best choice at present. When precise sample transfer is required, a syringe can be used

as a reservoir, and an syringe pump can be used to inject the required amount of liquid at a precise flow rate within a certain period of time for research in like chemical, biological, and medical fields.

DK INUSETEK is exactly a highly reliable brand that can provide top-notch syringe pumps to meet research needs, which has got you covered for microfluidics, flow chemistry, industrial coatings, and LNP formulation, among others.

HOW TO MAKE SURE CHOOSING THE RIGHT SYRINGE FOR THE EXPERIMENT?

Key point is to understand the property of the medium needed to be transmitted, the volume of injection, and the specific injection location and method.
To have the right selection of syringe, it's important to identify the type of sample to be processed and determine the minimum volume to be dispensed or injected. Upon figuring these out, you'll be able to use them as the basis for choosing the material, size, and specifications of the syringe.

And a kindly reminder: Before transferring liquids, please read the relevant safety data sheets and pay attention to material compatibility, especially when handling hazardous chemicals or conducting experiments under extreme conditions such as high temperature or pressure. You can search for relevant information online, or you are also welcome to consult our technical service personnel by sending us email.

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