

# Advantages & Disadvantages of Syringe Pump

## Introduction

The syringe pump, as one of the standard devices in the laboratory, is the preferred equipment for accurately transferring trace amounts of liquid chemicals, solvents, or any other fluids. The mechanism of fluid transport is simple, which also represents a high standard of accuracy and precision in fluid delivery.

However, like any other device, syringe pumps also have some limitations in practical use. In this article, we will provide a detailed introduction to the technical characteristics and the inherent advantages and disadvantages of syringe pumps.

## Advantages of Syringe Pump

In the laboratory field, syringe pumps have significant advantages in accuracy and usability compared to other types of fluid handling methods. Thanks to the emergence of new advanced mechanical and electronic components, as well as innovative designs, which continue to improve its overall performance, the syringe pumps are still widely used in laboratories in various research fields.

- The latest developments in electromechanical technology have brought higher level of accuracy and more accurate flow control - syringe pumps now have higher smoothness and can be almost no pulsation over a larger flow range.
- Due to its ability to accommodate syringes as small as 0.5  $\mu\text{L}$ , it can transfer PI level small volume fluid transfer; Meanwhile, as large as 150mL syringe can also be used to meet more application needs.
- For the new syringe pumps, you can now adjust the flow rate in real time, there's a circulation mode, multiple manufacturer's syringe options are preset, the liquid volume can be calibrated, and some common operating modes can be saved.
- It can be controlled by a touch screen, making it easier to operate and displaying the running status intuitively.
- Syringe pumps can maintain high accuracy without being easily affected by liquid and environmental factors such as viscosity, humidity, surface tension, water pressure or air pressure.

## Product Knowledge

- The syringe pump is relatively easy to operate and clean. Due to the presence of liquid in the syringe, it is one of the cleanest and easiest to maintain pumps.
- Up to 12 syringes can be installed, which can be used for parallel administration and other application fields, operational efficiency has been greatly improved.



- As a chemist, you can use a syringe pump to deliver multiple reagents at once, which is very useful in multi-step chemical synthesis experiments.
- In cellular biology applications, syringe pumps are the preferred choice for fine cell microinjection of plasmids and viruses.
- The syringe pump can also be used for mass spectrometry and electric spray ionization to ensure smooth and accurate fluid delivery and achieve the best instrument calibration effect.
- Syringe pumps can be used in a wide range of applications, and the most commonly used consumable - plastic syringes - are inexpensive and have lower costs.
- High quality pumps are very durable and can typically be used for up to 5 to 6 years without any quality issues.

## Disadvantages of Sringe Pump

The syringe pump has several limitations and may not be suitable for some certain applications.

- The market price of pumps usually ranges from 1 thousand to tens of thousands of dollars - except for some outdated models specifically provided for low-end applications with low performance requirements. Some models require glass syringes, which the unit price is relatively pretty high.
- The manufacturing and maintenance costs of industrial syringe pumps are relatively high, which makes it difficult to be widely applied in some economically limited situations. The higher cost involves multiple aspects such as equipment procurement, maintenance, and component replacement, which limits the use of some small and medium-sized enterprises or some specific fields.
- Due to limitations in syringe size, most syringe pumps are unable to continuously, accurately, and smoothly transfer larger amount of liquid. However, our CFSP-I syringe pump has effectively overcome this limitation and can be seen as a syringe pump with peristaltic pump's characteristics.



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