

General Information for PAL Smart Syringes



Smart-Chip - each Smart Syringe is equipped with its own read/write chip with preset parameters, ranges and usage tracking. The syringe is automatically recognized by the PAL System and all important parameters are automatically loaded. Every syringe can be traced over its complete lifetime by means of its unique ID.

Color Code for Easy Identification of the Syringe Volume: Each syringe head is colored according to the color code printed on every CTC syringe package.

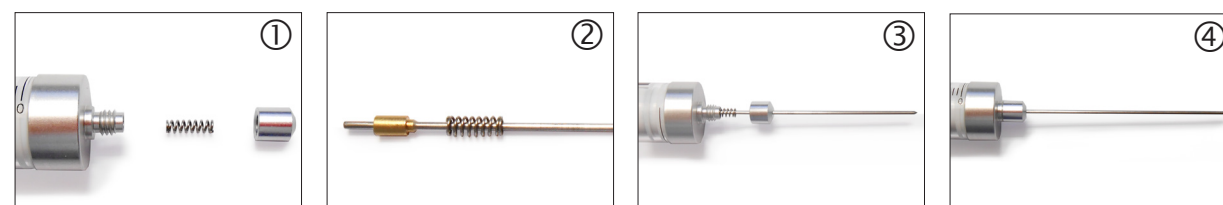


Syringe Type / Lot number on the barrel flange (Version 1)
For one type of the PAL Smart Syringes the order number and lot number can be found on the barrel flange of the syringes.

Syringe Type / Lot number on the barrel (Version 2)
For the second type of the PAL Smart Syringes the order number and lot number can be found each in a black square on the barrel of the syringes.

Exchangeable needle
If the order number starts with "SE", "SHE" or "SCE" the Smart Syringe is prepared for an exchangeable needle. The metal luer lock needs to be unscrewed to insert and fix the needle. When loosening the metal luer, make sure the small spring doesn't get lost!

Inserting an exchangeable needle (the spring has to be placed between needle and metal luer:



Coding of the PAL Smart Syringes type:

Syringe Type	SF10-57-T-23S-CO	Syringe Type consists of up to 6 coded parts separated by a minus, except between black and red part
Black part	SF - - - - -	<p>The black part codes for typical use:</p> <p>SF: Syringe with Fixed needle SFX: Syringe with Fixed needle (X-type) SE: Syringe with Exchangeable needle SH: Syringe for Headspace SHE: Syringe for Headspace with exchangeable needle SP: Syringe with side Port (in glass part) SC: Syringe Customized SCE: Syringe Customized with exchangeable needle SITEX: Syringe for ITEX Tool, no needle SLCMS: Syringe for LCMS Tool, no needle</p>
Red part	SF10- - - - -	<p>The red part codes for the volume</p> <p>0: 0.5 µL 1: 1 µL 5: 5µL 10: 10 µL ... 10000: 10000µL</p>
Green part	SF10-57- - - - -	<p>Green part codes for the needle length</p> <p>57: 57mm 65: 65mm 85: 85mm</p> <p>For syringes with exchangeable needles the green and the gray part are switched around.</p>
Gray part	SF10-57-T- - - - -	<p>Gray part codes for plunger types</p> <p>T: PTFE M: Metal PE: Polyethylene B: Plunger in Needle</p> <p>For syringes with exchangeable needles the green and the gray part are switched around.</p>
Violett part	SF10-57-T-23S- - - - -	<p>Violett part codes for Needle Gauge</p> <p>19: Needle Gauge 19 ... 26S: Needle Gauge 26S 26P: Needle contains Plunger</p>
Orange part	SF10-57-T-23S-CO- - - - -	<p>Orange part codes for the Needle Tip</p> <p>CO: CONical FL: FLat SP: Side Port (needle) ST: Step Needle (like COC Syringe)</p>

PALSmart Syringes

Instructions for use, care and maintenance from 0.5 µl to 10,000 µl Syringes with PTFE, PE and metal plunger.

Specifications

Operating Temperature:	
Liquid Fixed Needle Syringes:	4°C - 40°C
Liquid Exchangeable Needle Syringes:	4°C - 80°C
Headspace syringes:	4°C - 100°C
Glue free Headspace & ITEX syringes:	4°C - 150°C
Exchangeable Needle Headspace Syringes:	4°C - 100°C

Accuracy and reproducibility:	± 1% of the displaced volume at maximum volume.
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Instructions

- Before use, check the syringe body for cracks and the needle tip for injuries.
- To perform a manual injection, overfill the syringes and gently press the plunger until the correct volume is reached. Pull the plunger back a little and wipe the needle with a lint-free cloth, preferably without touching the tip of the needle and using the cloth to suck sample out of the syringe.

Inject or dose.

- To ensure accuracy, the smallest volume of syringe injected should be at least 10% of the total capacity.
 - To remove bubbles, prime the syringes in the sample or rotate the syringes with the needle tip pointing upward into the vertical, tap the side of the syringe body to remove the bubbles and then remove them from the syringes.
 - It is recommended to draw up more sample than you want to inject and then release this excess after removing the air bubbles.
 - Once the sample has been drawn and primed, it is recommended to clean the syringe from the outside with a lint-free cloth to avoid carry-over. Again, be careful not to touch the needle tip with the cloth to prevent the sample from being sucked out of the syringe.
 - To avoid carry-overs between samples, rinse the syringe 5 to 20 times with solvent.
- Do not forget to dispose of the first 2-3 washes.

Cleaning and care

- The choice of syringe cleaner depends on the contaminating material. For cleaning, pure solvents or fully miscible solvent mixtures are usually used. It is recommended not to use halogenated or aromatic solvents such as dichloromethane, chloroform or toluene where possible.
- For applications that require these solvents, syringes with removable needles are recommended as the needles are not sticky and there is no risk of detachment.
- After cleaning, rinse the syringes with acetone, remove the plunger and air dry both.
 - Under no circumstances immerse the entire syringe in solvent as this may damage the adhesive used to bond the components of the syringe.
 - Wipe the outside of the syringe with a lint-free cloth.
 - Sterilization:
- The syringes are not intended for autoclaving.

Plunger maintenance

- A syringe must never be lubricated with grease, as the use of grease will lead to a large number of carry-over problems. If the plunger feels rough or slightly tilted, you should clean the syringe.
- Be careful not to touch the plunger and plunger tip with your fingers as this will contaminate them.
- If you remove the plunger from the syringe, clean the syringe and needle before reassembling the syringe. The plunger should be wiped with a lint-free cloth and the syringes cleaned with solvent.

Plunger with PTFE tip

- Avoid turning the plunger when the syringe is dry.

Metal plunger

- Avoid unnecessary movement of the plunger when the syringe is dry.
- Never force the plunger.
- Do not move the plunger when the needle is blocked as the pressure generated could damage the syringe body.

- Wipe the plunger clean with a lint-free cloth before replacing. Be careful not to bend the plunger.
- Spare metal plungers for standard syringes are not available. Metal plungers are individually fitted to each syringe body to achieve an ideal seal. This means that the plungers are not interchangeable.

Needle Care

- Check the needle for damage before use.
- To expose clogged needles, remove the plunger and fill the syringe with solvent using another syringe. Reinsert the plunger and gently push the solvent through the needle. Never force the plunger. Too much pressure can damage the syringe body. If the needle does not return to normal operation, Exchangeable Needle Syringes is easy to replace. The glass body should also be replaced after three to five exchange needles at the latest to ensure good performance. Fixed Needle Syringes must be replaced completely. Mechanical cleaning attempts of the needles, strong acids, bases or ultrasound are strongly discouraged. Even if the needle appears perfect again, the syringe can only be used manually and must never be used unattended in the autosampler. The same applies to bent needles that have been more or less “straightened” again. Safe operation in the autosampler is not possible.
- To replace the needles, unscrew the front cover nut and then remove the spring and needle. Carefully insert the replacement needle into the front of the syringe, slide the spring and cover nut over the needle and screw the nut onto the front screw of the syringe body.

Storage

- To prevent damage to the syringe body, store the syringe rings in their original packaging or on a syringe stand.
- Always clean the syringe thoroughly before storage and ensure that it is dry before storage.
- Store PTFE plungers always separated from the syringe body.

Shelf life

- The syringes can be stored dry and dust-free for more than 2 years.

Lifetime Expectations:

Typical lifetimes of syringes depend to a large extent on the nature of the samples and the process parameters. The samples must be particle-free to prevent abrasion of the plunger, needle and glass. Oxidizing acids, strong acids and bases, inadequate maintenance and cleaning, operation at speed limits can drastically shorten the lifetime. For fast injections, the syringe should not be filled above 50%.

In the example of 10µL injections and injection rates > 20µL/s, a 25µL syringe is better than a 10µL syringe to achieve maximum lifetime.

PE & PTFE Plunger:

Typical durability of PTFE and PE plungers with pure non-halogenated solvents is more than 70,000 strokes. This applies to pipetting volumes of 50% of nominal volume and default settings of aspirates and dispensing speeds.

Metal Plunger:

Metal plungers are much more sensitive than PTFE plungers and must never be used dry or with water. This can cause the plunger to size up and irreversibly damage the syringe after just a few cycles. The plunger should be carefully removed once a week and rubbed with a lint-free cloth soaked in isopropanol. Typical durability of metal plungers with pure organic solvents is more than 30,000 strokes, if the plunger is frequently cleaned once per week with Kimwipes® and isopropanol. This applies to pipetting volumes of 50% of the nominal volume and the default settings of the aspiration and dispensing speeds.

Needles:

Typical durability of needles with PALsystem certified septa and the default penetration speeds of syringes are > 10,000 penetrations. An unintended collision usually leads to direct damage.



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