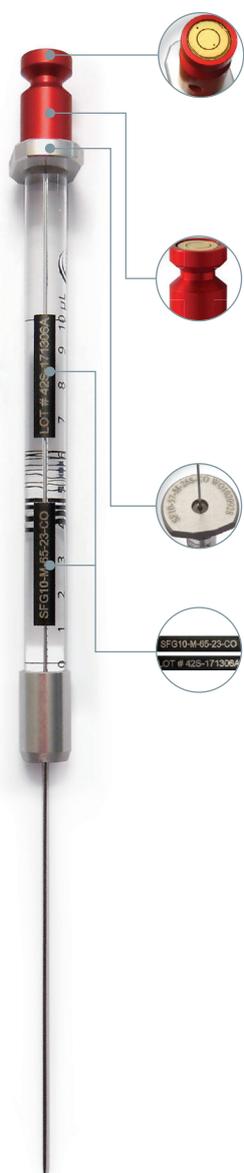


# Smart Syringe

## ■ Note

This data sheet contains important notes for the operator. It is highly recommended for operators to become familiarized with the product prior to use.

## ■ General Information



### 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 AOC-6000 Plus 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 syringe package.



### Syringe Type / Lot number on the barrel flange

For one type of the 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

For the second type of The Smart Syringes the order number and lot number can be found each in a black square on the barrel of the syringes.



## ■ Coding of the Smart Syringe Type

Syringe Type	SF10-57-T-235-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</p>
Red part	SF10- - - - -	<p>The red part codes for the volume</p> <p>0: 0.5 µL            1: 1 µL            5: 5 µL            10: 10 µL            ...            10000: 10000µL</p>
Green part	SF10-57- - - -	<p>Green part codes for the needle length</p> <p>57: 57mm            65: 65 mm            85: 85 mm</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-235- -	<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-235-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>

## ■ Ordering Information

Application	P/N	Syringe Type	Point Style	Volume	Gauge	Plunger Type
Liquid Injection	227-35352-02	SF10-57-M-235-CO	Conical	10 µL	23S	Metal
Liquid Injection	227-35353-01	SF10-57-T-26S-CO	Conical	10 µL	26S	PTFE
Liquid Injection	227-35353-02	SF10-57-T-23S-CO	Conical	10 µL	23S	PTFE
Liquid Injection	227-35354-01	SF25-57-T-26S-CO	Conical	25 µL	26S	PTFE
Liquid Injection	227-35354-02	SF50-57-T-26S-CO	Conical	50 µL	26S	PTFE
Liquid Injection	227-35355-01	SF100-57-T-26S-CO	Conical	100 µL	26S	PTFE
Liquid Injection	227-35356-01	SF250-57-T-26-CO	Conical	250 µL	26	PTFE
Liquid Injection	227-35357-01	SF500-57-T-26-CO	Conical	500 µL	26	PTFE
Liquid Injection	227-35358-01	SF1000-57-T-23-CO	Conical	1000 µL	23	PTFE
Headspace Injection	227-35359-01	SH2500-65-T-23-SP	Side Point	2500 µL	23S	PTFE
ITEX Injection	227-35385-01	SITEX-1300-T	Side Point	1300 µL	23S	PTFE

## ■ Smart Syringe Information

### • Specification

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

Accuracy and reproducibility:  $\pm 1\%$  of the displaced volume at maximum volume.

### • 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.
- 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.
- 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 in the case of Exchangeable Needle Syringes, 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 10 $\mu$ L injections and injection rates > 20  $\mu$ L/s, a 25  $\mu$ L syringe is better than a 10  $\mu$ L 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 seize 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 aspirates and dispensing speeds.