# PAL SPME Manual Injection Kit

## cat.# 27490 (for use with non-smart SPME Arrows and fibers)

**Figure 1:** Parts Included in the PAL SPME Manual Injection Kit


| | |
|---|---|
| 1 | Extraction guide |
| 2 | Injection guide |
| 3 | Arrow/fiber syringe |
| 4 | Large inner diameter (ID) locking screw |
| 5 | Small inner diameter (ID) locking screw |

### 1. Description

The Restek PAL SPME manual injection kit will allow the end user to extract samples using SPME Arrows or SPME fibers and then inject the samples into a GC inlet.* The Restek PAL SPME manual injection kit includes the components shown in Figure 1. SPME Arrows, SPME fibers, GC-specific conversion kits (including adaptor cups), and additional adaptor cups are sold separately.

Due to the relatively large diameter of Restek PAL SPME Arrows, it will be necessary to modify the GC inlet prior to use. Conversion kits include the following instrument-specific parts: a GC injection port weldment, an adaptor cup, a five-pack of liners, a three-pack of septa, and a septum nut. Conversion kits are available for the following types of GCs:

| GC | Conversion Kit Cat.# |
|---|---|
| Thermo TRACE Ultra | 27495 |
| Thermo TRACE 1300/1310 | 27494 |
| Agilent GC 6890 | 27492 |
| Agilent GC 7890 | 27493 |
| Shimadzu GC 2010 | 27491 |

### 2. Installing a SPME Arrow or SPME Fiber in the Syringe

2.1 Loosen the cap (6) at the base of the syringe (8) and remove it (Figure 2).

2.2 Depress the black plunger completely and screw the hub of a SPME Arrow or SPME fiber (7) into the bottom of the plunger at the end of the syringe body (8).

2.3 Slide the cap (6) over the SPME Arrow or SPME fiber and tighten it onto the syringe (8) as shown in Figure 3.

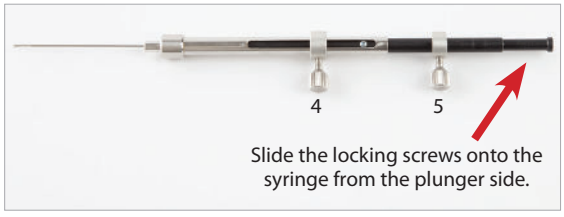
2.4 Slide the locking screws (4 and 5) onto the syringe (8) from the plunger side (the right side as shown in Figure 4). First, install the large ID locking screw (4) onto the silver body of the syringe; then, install the small ID locking screw (5) onto the wider portion of the black plunger.

2.5 Tighten the locking screws until finger-tight. Do not overtighten, as they will be adjusted in subsequent steps.

**Figure 2:** Disassembled View of Syringe and SPME Arrow (or Fiber) Prior to Installation


**Figure 3:** SPME Arrow/Fiber Installed in Syringe

**Figure 4:** Attaching the Locking Screws to the Syringe




*Cat.# 27490 is for use with non-smart SPME Arrows and fibers only.

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## 3. Setting the Extraction Depth using the Extraction Guide

As shown in Figure 5, the extraction guide has two positions in which the syringe can be installed. Use the upper position (9) for headspace extraction and the lower position (10) for immersion extraction. For fine adjustment of the extraction depth, please refer to section 3.1 for headspace extraction and section 3.2 for immersion extraction. The extraction guide is designed for use with 18 mm and 20 mm headspace vials.

3.1 Fine Depth Adjustment for Headspace Extraction

3.1.1 Raise the syringe plunger to the fully extended position and insert the syringe and lower locking screw (4) into the upper position of the extraction guide. Lock the syringe into place by rotating it until the locking screw is positioned in the notch (Figure 6).

3.1.2 Loosen the lower locking screw (4).

3.1.3 Adjust the syringe so that the SPME Arrow or SPME fiber is protruding ~1 cm beyond the inner base of the extraction guide. When in proper position, the tip of the SPME Arrow or SPME fiber will be recessed at least 1 mm in from the end of the extraction guide (Figure 7).

3.1.4 Tighten the lower locking screw (4) securely onto the silver body of the syringe. Do not tighten the screw against the black plunger or you will not be able to move the SPME Arrow or SPME fiber into position for sampling (Figure 8).

*The septum penetration depth is now set. Proceed with steps 3.1.5 and 3.1.6 to the set the proper exposure depth for headspace extraction.*

3.1.5 Place the extraction guide (with the syringe in place) on an empty headspace sampling vial and loosen the upper locking screw (5).

3.1.6 Adjust the SPME Arrow or SPME fiber to the desired exposure depth by moving the black plunger up and down (Figure 9). Choose a depth that ensures the SPME Arrow or SPME fiber will be in the gas phase and not submerged in the liquid phase of the sample.

3.1.7 Once the SPME Arrow or SPME fiber is at the proper depth, hold the plunger in place and slide the upper locking screw (5) until it is flush against the top of the silver syringe body. Then tighten the upper locking screw (5) securely as shown in Figure 10.

3.2 Fine Depth Adjustment for Immersion Extraction

3.2.1 Insert the syringe into the lower position (10) of the extraction guide (Figure 5).

3.2.2 Penetrate a vial and fully expose the SPME Arrow or SPME fiber within the vial (Figure 11).

3.2.3 Adjust the lower locking screw (4) and upper locking screw (5) in order to obtain the desired exposure depth (one that ensures immersion in the sample liquid). Note: If using a SPME fiber, set a depth that prevents the tip of the fiber from hitting the bottom of the vial as this can damage the fiber. If using a SPME Arrow, this is not a concern due to the Arrow's protective tip.

## 4. Adjusting the Injection Guide

Note: The positions of the upper (4) and lower (5) locking screws are set based on the extraction technique and the depths used in either section 3.1 or 3.2. Do **not** change the position of the locking screws during the following steps.

4.1 Carefully insert the syringe (3) into the injection guide (2). Use caution and avoid damaging the SPME Arrow or SPME fiber when threading it through the hole in the base of the injection guide.

4.2 Lock the syringe into place by rotating it until the locking screw is positioned in the notch (Figure 12).

4.3 With the appropriate GC-specific adaptor cup on the end of the injection guide, measure the distance from the tip of the SPME Arrow or SPME fiber to the groove inside the adaptor cup (Figure 13).

4.4 Adjust the desorption depth by screwing the body of the injection guide up or down.

4.5 Set the depth to a maximum of 67 mm.

4.6 Twist the locking ring down until it locks on the body of the injection guide (Figure 14).

**Figure 5:** The extraction guide has two extraction positions (notches).


**Figure 6:** Syringe Installed in the Extraction Guide


**Figure 7:** Proper Positioning of a SPME Arrow in the Extraction Guide

**Figure 8:** Incorrect and Correction Position of the Lower Locking Screw

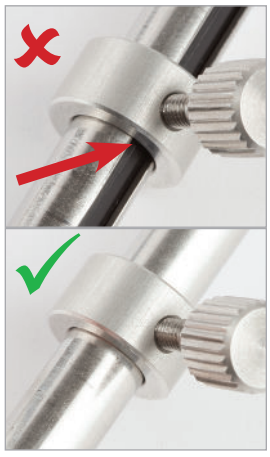


**Figure 9:** Exposure Depth for Headspace Extraction

**Figure 10:** Upper Locking Screw (5)

## 5. Typical Workflow with Restek PAL SPME Manual Injection Kit

5.1 Extraction

5.1.1 Attach a SPME Arrow or SPME fiber to the syringe (3) and install the syringe (3) into the extraction guide (1) at the appropriate depth settings.

5.1.2 Penetrate the sample vial septum with the black plunger up so that the SPME Arrow or SPME fiber is fully retracted.

5.1.3 Push the black plunger down until it rests on the silver body of the syringe (3) to expose the SPME Arrow or SPME fiber for sampling.

5.1.4 Extract for the prescribed length of time.

5.1.5 Pull the black plunger all the way up to fully retract the SPME Arrow or SPME fiber.

5.2 Remove the syringe (3) from the extraction guide (1) and place the syringe (3) into the injection guide (2).

5.3 Injection

5.3.1 Install the syringe (3) in the injection guide (1) and set the appropriate desorption depth using the correct GC-specific adaptor cup for your GC.

5.3.2 Penetrate the septum on the GC inlet with the black plunger up so the SPME Arrow or SPME fiber is fully retracted.

5.3.3 Push the black plunger down until it rests on the silver body of the syringe (3), exposing the SPME Arrow or SPME fiber in the GC inlet.

5.3.4 Desorb for the prescribed length of time.

5.3.5 Pull the black plunger all the way up to fully retract the SPME Arrow or SPME fiber.

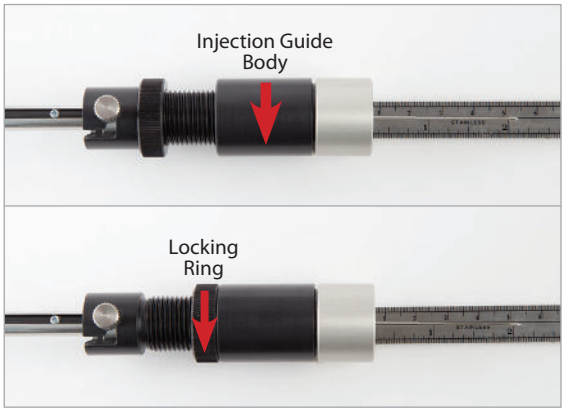
5.3.6 Remove the injection guide and syringe from GC inlet.

**Figure 11:** Exposure Depth for Immersion Extraction

**Figure 12:** Injection Guide with GC-Specific Adaptor Cup

**Figure 13:** Distance from Lower Groove of the Adaptor Cup to Tip of SPME Arrow or SPME Fiber

**Figure 14:** Adjusting the Desorption Depth



**Questions about this or any other Restek product?**
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**#500-60-003** Rev. date: 1/24

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