PAL SYSTEM
Ingenious sample handling

General Information for PAL SPME Fibers

Note:

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

PAL SPME Fibers
Example Collection -
Development Kit

PAL SPME Fiber Order Information

PAL SPME Fibers are available in order quantities of one, three or five SPME fibers per box.
For method development, sets of five different SPME fiber types are available.

No.	Stationary Phase	Color Code	Set of 1 Fiber Description PNo.	Set of 3 Fibers Description PNo.	Set of 5 Fibers Description PNo.
	PDMS Fiber (Polydimethylsiloxane)				
1	7 µm	Green	FIB-P-7/10-P1	FIB-P-7/10-P3	FIB-P-7/10-P5
2	30 µm	Golden	FIB-P-30/10-P1	FIB-P-30/10-P3	FIB-P-30/10-P5
3	100 µm	Red	FIB-P-100/10-P1	FIB-P-100/10-P3	FIB-P-100/10-P5
	Acrylate Fiber (Polyacrylate)				
4	85 µm	Gray	FIB-A-85/10-P1	FIB-A-85/10-P3	FIB-A-85/10-P5
	Carbon WR Fiber / PDMS (Carbon Wide Range / Polydimethylsiloxane)				
5	95 µm	Dark blue	FIB-C-WR-95/10-P1	FIB-C-WR-95/10-P3	FIB-C-WR-95/10-P5
	DVB / PDMS (Divinylbenzene / Polydimethylsiloxane)				
6	65 µm	Violet	FIB-DVB-65/10-P1	FIB-DVB-65/10-P3	FIB-DVB-65/10-P5
	DVB / PDMS / Carbon WR (Divinylbenzene / Polydimethylsiloxane / Carbon Wide Range) - Triple phase				
7	80 µm (50 µm // 30 µm)	Dark gray	FIB-DVB/C-WR-80/10-P1	FIB-DVB/C-WR-80/10-P3	FIB-DVB/C-WR-80/10-P5
SPME Fiber Selections for method development (set of 5 different SPME Fiber types)					
Fiber Selection of SPME fiber No. 1, 2, 3, 4 and 5					FIB-SEL5-S1
Fiber Selection of SPME fiber No. 3, 4, 5, 6 and 7					FIB-SEL5-S2

Table 1. PAL SPME Fiber Order Information.

All PAL SPME Fibers have a standard length of 10 mm and the core material is Fused Silica.

PAL SPME Fibers can be used for a wide range of GC and injector models.
PAL SPME Fiber assortment and the range of applications will be constantly expanded and developed.
In order to receive first-hand information, register directly under the web page www.palsystem.com.

PAL SPME Fiber Conditioning and Cleaning

Caution:

Without gas protection the fiber surface will be damaged, if exposed to elevated temperatures.

Fiber Preconditioning

Prior to analytical use, it is mandatory to precondition each fiber at a specified temperature in an inert gas phase environment. The life span of the fiber can be extended if the fiber is not unnecessarily preconditioned at maximum temperature.

Generally, it is recommended to precondition the fiber 20°C above the planned operating temperature, but not above the maximum allowed temperature of the specific SPME fiber. Recommended temperatures and conditioning times are given in Table 2.

Fiber Conditioning

It is part of the analytical process to condition the fiber after thermal desorption of the analytes has been completed. This conditioning is a preparatory step for the next analytical run.
It is necessary to eliminate all possible contaminants from the fiber which have not been desorbed and transferred to the GC column.

To avoid contamination of the GC inlet system and/or the GC column, it is recommended to remove the fiber after the thermal desorption step from the GC injector and move the SPME Tool to a SPME Conditioning Module for the conditioning step.

The large surface of the fiber can trap impurities from the ambient atmosphere if a fiber has been left in the open. Considering this, it is good recommended practice to run a blank prior to running a series of analytical samples. Evaluating the baseline level of the GC detector helps to ensure that the entire system, such as the fiber, the GC inlet, the GC column, and detector, is free from any contaminants.

Rinsing of Fibers

It is possible to clean the fiber using an organic solvent, should the fiber be subject to inappropriate storage, e.g keeping the fiber in the open at ambient environment without protection for a prolonged period, or if obvious dust particles are sticking to the fiber. The recommended types of solvents are listed in Table 2.

Do not use any other solvents than those mentioned here. Other solvents can cause a swelling of the fiber which would lead to significant damage. It is important that a fiber is not cleaned mechanically by any means; do not touch the fiber with fingers, not even when wearing gloves. The cleaning process can be done manually by dipping the fiber into a container filled with the appropriate solvent or in an automated manner by defining a vial for cleaning.

To avoid a potential misunderstanding, do not use a wash or waste solvent of the Wash Module from the PAL System. This solvent can be contaminated or the solvent in use may not be suitable for the particular fiber type.

General Remarks for Fiber Conditioning and Cleaning

Table 2 summarizes the various parameters for conditioning and cleaning. The values provided are empirical values which are suitable for a number of applications and give reliable results. The life span of a fiber depends to a great degree on the field and type of application. Using the SPME technique, by inserting the fiber into a liquid with a high degree of matrix, the number of analyses can vary from a few to approximately 100 analyses. If the fiber is positioned in the headspace of a vial and avoids any contact with liquid and matrix, it is typically possible to run several hundred extractions.

It is not possible to visually judge the fiber quality if there are no obvious signs of major mechanical damage, such as a fiber fracture.

Any sign of staining, caused by a starting vitrification of the surface in case of a PDMS fiber, or signs of a yellowish discoloration in the case of a Polyacrylate fiber, does not give any indication on the remaining life span of the particular fiber.

As a rule of thumb, the life span of a fiber can be extended if its exposure to high temperatures is minimized. Do not exceed the maximum temperature for each fiber type as shown in Table 2.

PAL SPME Fiber Temperature and Fiber Conditioning Recommendations

No.	Stationary Phase	Maximum Temperature (°C)	Recommended Operating Temperature (°C)	Preconditioning Temperature (°C) min. | max.	Preconditioning Time (min) min | max | recom.	Conditioning Temperature (°C) min | max	Conditioning Time (min) min | max | recom.	Fiber Rinsing Solvent	Fiber Rinsing Time (min) min | max | recom.
	PDMS Fiber (Polydimethylsiloxane)								
1	7 µm	340	200-340	200 | 340	15 | 120 | 30	200 | 340	1 | 60 | 5	MeOH | EtOH iProp	0.5 | 10 | 2
2	30 µm	280	200-280	180 | 280	15 | 120 | 30	180 | 280	1 | 60 | 5	MeOH | EtOH iProp	0.5 | 10 | 2
3	100 µm	280	200-280	180 | 280	15 | 120 | 30	180 | 280	1 | 60 | 5	MeOH | EtOH iProp	0.5 | 10 | 2
	Acrylate Fiber (Polyacrylate)								
4	85 µm	280	200-250	180 | 280	15 | 120 | 30	180 | 280	1 | 30 | 5	MeOH aliphatic HC	0.5 | 2 | 1
	Carbon WR Fiber / PDMS (Carbon Wide Range / Polydimethylsiloxane)								
5	95 µm	300	220-300	200 | 300	15 | 120 | 60	200 | 300	1 | 60 | 10	MeOH | EtOH iProp	0.5 | 10 | 2
	DVB / PDMS (Divinylbenzene / Polydimethylsiloxane)								
6	65 µm	300	220-300	200 | 300	15 | 120 | 60	180 | 280	1 | 60 | 10	MeOH | EtOH iProp	0.5 | 10 | 2
	DVB /PDMS/ CarbonWR (Divinylbenzene / Polydimethylsiloxane / CarbonWideRange)- Triple phase								
7	80 µm (50 µm // 30 µm)	300	220-300	200 | 300	15 | 120 | 60	180 | 280	1 | 60 | 10	MeOH | EtOH iProp	0.5 | 10 | 2

Table 2. Operational Parameters for PAL SPME Fibers. MeOH = Methanol iProp = Iso-Propanol (2-Propanol) EtOH = Ethanol aliphatic HC = aliphatic hydrocarbons (example n-Hexane)

Installation of the PAL SPME Fiber

The PAL SPME Fibers are compatible with the following Autosamplers:

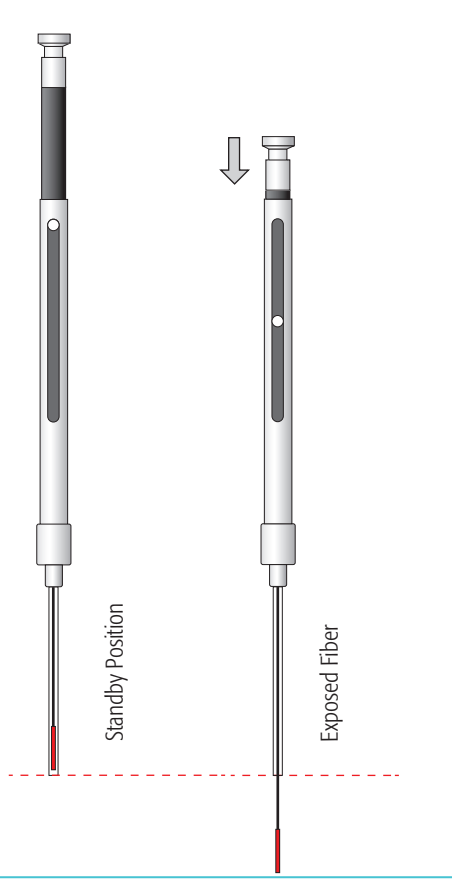
PAL-*xt* SPME Holder

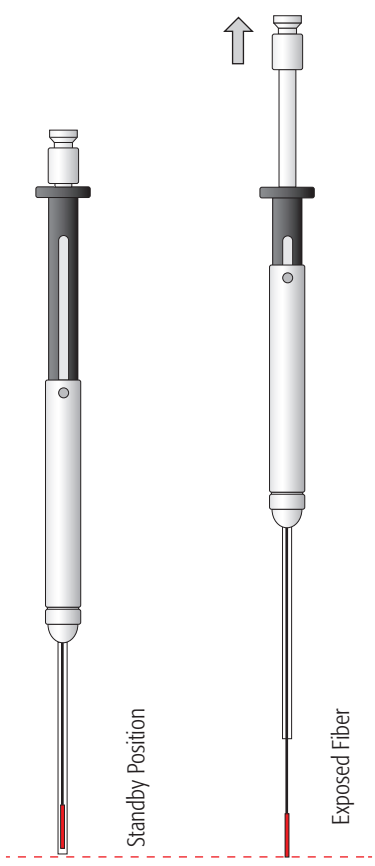
PAL and PAL-*xt* System models dedicated for SPME technique, such as Combi PAL or PAL COMBI-*xt*. The fibers match with the fiber holder currently used in these systems.

PAL SPME Tool

PAL3 System models PAL RTC and PAL RSI or the corresponding product or model names distributed by OEM partners. For the PAL3 System, a new patented SPME Holder has been developed with a maximum needle penetration depth of 70 mm.

This holder is not compatible with the previous PAL and PAL-*xt* Systems.





In order to implement the SPME technique with the above mentioned Autosamplers, a dedicated kit is required. Information about the various kits can be obtained from the CTC Analytics representative or directly from the web page **www.palsystem.com**.

An Agitator has to be part of the PAL System configuration. This allows performing the analysis temperature control; agitation also allows speeding up of the equilibration process.

A second optional module for PAL and PAL-*xt* Systems is the **SPME Fiber Conditioning Station**. For PAL3 Systems the **SPME Fiber Conditioning Module** or a **SPME Arrow Conditioning Module** can be used

The conditioning station has two functions. The first function is the cleaning (bake-out) of the inserted fiber after the analytical process to prepare for the next analysis. The second function is to condition a spare fiber in an inert gas phase. This module is strongly recommended since it will help to protect the GC injection port from contamination and free up the port after thermal desorption.

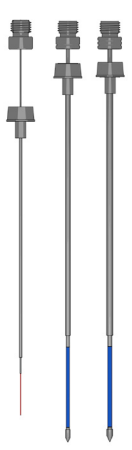
The new SPME Arrow Conditioning Module offers the conditioning of SPME fibers and SPME Arrows. SPME Arrow is the enhanced version of SPME, offering higher robustness, larger surface and larger volume of the stationary phases.

Find more at: **www.palsystem.com/consumables**.

Agitator Module

SPME fiber Conditioning Module

SPME Arrow Conditioning Module



Comparison between SPME fiber (red) and SPME Arrow (blue)