



PAL Smart SPME Fibers Optimized for Automation



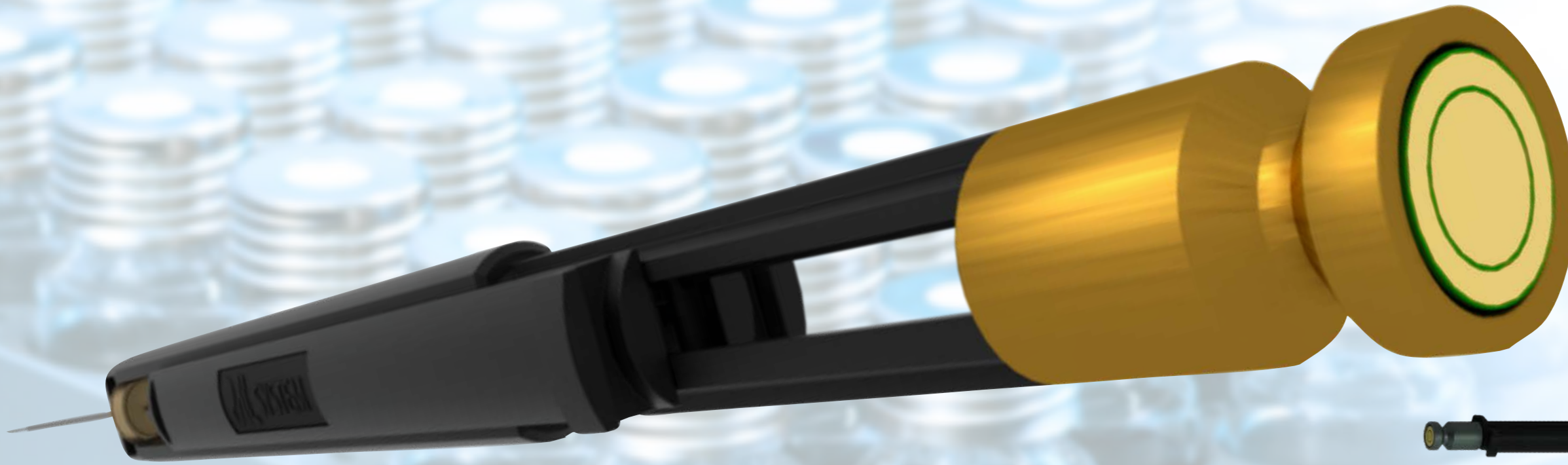
PAL3 Smart SPME Fibers

Each PAL Smart SPME Fiber is equipped with its own read/write chip with preset parameters, ranges, usage tracking and a unique ID.

PAL3 Smart SPME Fiber

Since its introduction by Pawliszyn et al. (ref. 1) Solid Phase Micro Extraction (SPME) has seen a tremendous development. It is used for extracting organics from a matrix (solid, liquid or gaseous) into a stationary phase immobilized on a fiber. The analytes are thermally desorbed directly in the injector of a gas chromatograph.

Reference¹⁾ Detection of substituted benzenes in water at the pg/ml level using solid-phase microextraction and gas chromatography-ion trap mass spectrometry. Potter DW, Pawliszyn J., J Chromatogr. 1992 Nov 20;625(2):247-55.



- Color coded for easy identification of coating type and thickness
- Full traceability
- Excellent extraction properties



Find more information about [SPME Fibers](#)

Comparison of PAL Smart SPME Fibers with established Fibers

The new PAL SPME Fibers (PDMS fibers 7 μm , 30 μm , and 100 μm and the polyacrylate fiber) yield identical results when compared with the corresponding commercial fibers. For medium and high boiling compounds the PAL SPME Carbon WR fiber in certain cases shows an even better performance than the established fibers.

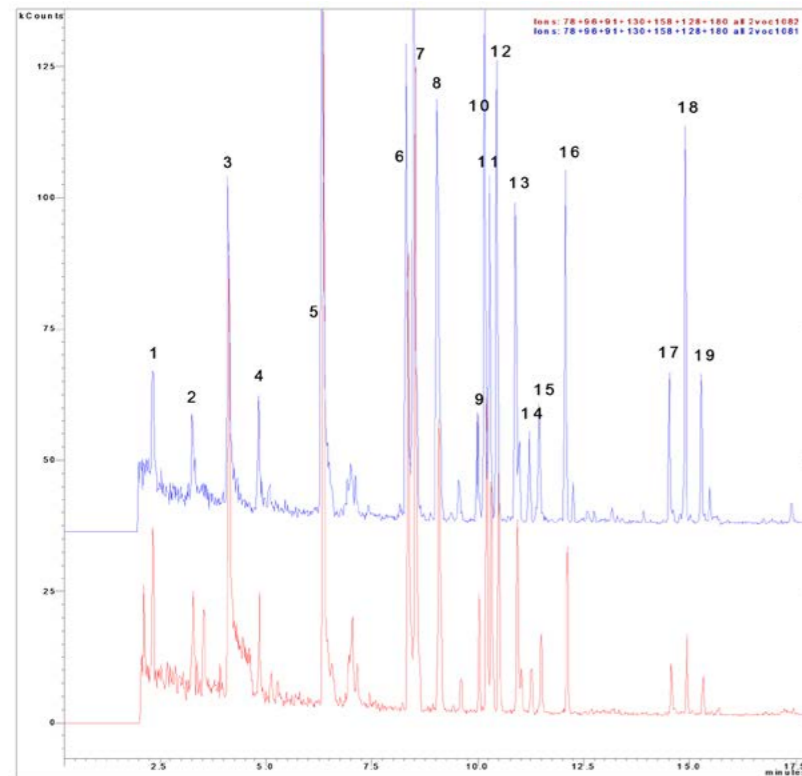


Fig. 1: Comparison of fibers for the analysis of VOCs: PAL SPME Carbon WR fiber 95 μm (blue) and Brand X Carboxen[®] fiber (red).

- 1 1,1-Dichloroethene
- 2 cis-1,2-Dichloroethene
- 3 Benzene
- 4 Trichloroethylene
- 5 Toluene
- 6 Ethylbenzene
- 7 m-,p- Xylene
- 8 o-Xylene
- 9 Bromobenzene
- 10 2-Chlorotoluene
- 11 1,3,5-Trimethylbenzene
- 12 4 Chlorotoluene
- 13 tert-Butylbenzene
- 14 1,2,4-Trimethylbenzene
- 15 sec-Butylbenzene
- 16 n-Butylbenzene
- 17 1,2,4-Trichlorobenzene
- 18 Naphthalene
- 19 1,2,3-Trichlorobenzene

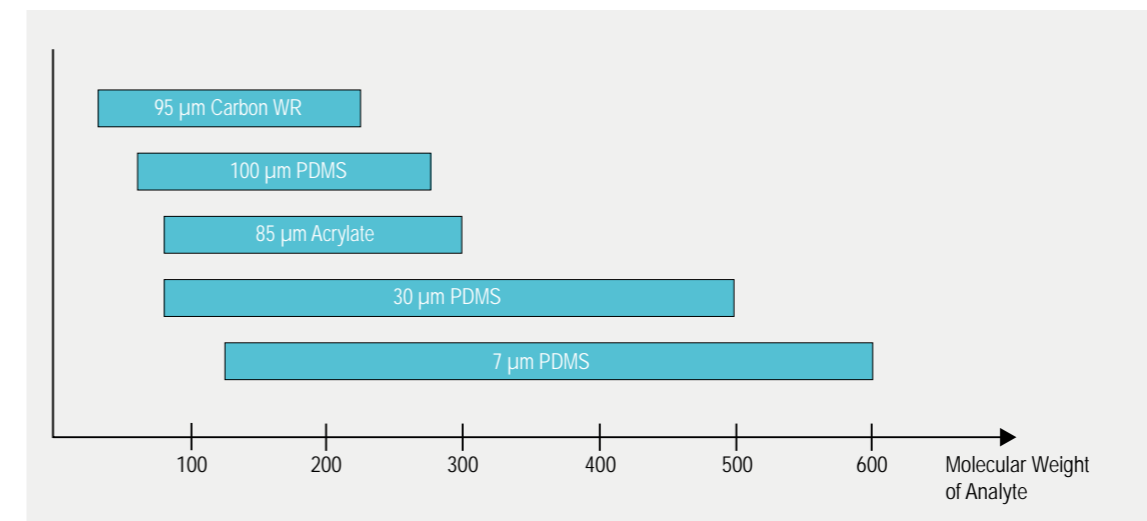


Fig. 2: Correlation between molecular weight of the analyte and the fiber type

Type of Analyte	Molecular Weight	Recommended Fiber
Non-polar high molecular weight compounds	125 - 600	7 μm PDMS (Polydimethylsiloxane)
Non-polar semi-volatiles	80 - 500	30 μm PDMS (Polydimethylsiloxane)
Polar semi-volatiles	80 - 300	85 μm PA (Polyacrylate)
Volatiles	60 - 275	100 μm PDMS (Polydimethylsiloxane)
Gases and low molecular weight compounds	30 - 225	95 μm Carbon WR / PDMS (Carbon Wide Range / Polydimethylsiloxane)

Table 1: Which fiber for which type of analyte?

Choose the right Fiber for your Analytes

Typical applications for the SPME technique are:

- Drugs and pharmaceuticals
- Trace Analysis in foodstuffs
- Herbicides / pesticides
- Medical diagnostics
- Water analysis (organics in water)
- Trace impurities in polymers and solid samples
- Solvent residues in raw materials

- Larger molecular weights or semi-volatile compounds are more effectively extracted using a 30 μm , or 7 μm PDMS-coated fiber.
- For an effective extraction of analytes with a very high polarity from polar samples, the 85 μm polyacrylate-coated fiber is the best alternative.
- For trace-level volatiles analysis, use the 95 μm Carbon WR (Carbon Wide Range / PDMS) coated fiber.

Note: The 100 μm and 30 μm PDMS-coated fibers cannot be used with hexane.

The type of the fiber corresponds to the polarity and the molecular weight of the analytes:

- For nonpolar samples a PDMS coated fiber should be chosen.
- For low molecular weights or volatile compounds a 100 μm PDMS-coated fiber is usually the best choice.

The new Smart Fibers are already premounted in its own holder for immediate use.

- No more manual fiber exchange needed
- Maximum fiber protection

-  PDMS - 7 μm
-  PDMS - 30 μm
-  PDMS - 100 μm
-  Polyacrylate - 85 μm
-  Carbon WR - 95 μm
-  DVB / PDMS - 65 μm
-  DVB / PDMS / Carbon WR - 80 μm (50 μm / 30 μm)

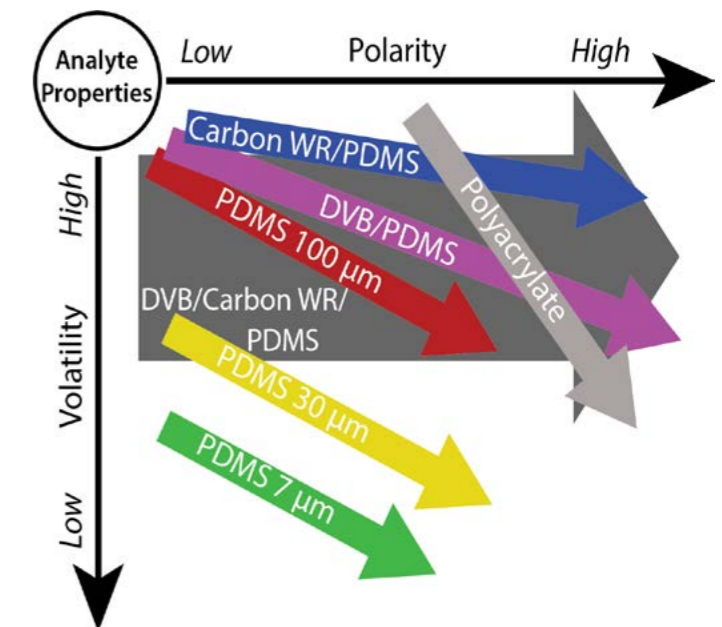


Fig. 3: Color Code for easy optical identification of coating type and thickness

PAL Smart SPME Fiber Ordering Information

The PAL Smart SPME Fibers are available in order quantities of one, three or five fibers per box. For method development, a set of each fiber type (set of five) is available.

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

Table 2: PAL Smart SPME Fiber Order Information.

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




PAL Smart SPME Fibers can be used for a wide range of GC and injector models and are fully backward compatible with non smart SPME Fibers any generation of PAL3 Systems.

PAL Smart SPME Fiber Accessories

To use the SPME technique with a PAL System a dedicated kit is required, for more information see following table.

An Agitator is highly recommended for temperature controlled extractions. Furthermore the agitation speeds up the equilibration process.

A second optional module is the SPME Arrow Conditioning module, which can be used for conditioning of SPME Arrows and SPME fibers prior to sample enrichments. The Conditioning module 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 new fiber in an inert gas atmosphere. 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.

Smart SPME Kit PAL3-SPME-SFib-Kit		Smart SPME kit, consisting of: 1 pc SPME tool 1 pc SPME Fiber assortment kit (SFIB-SEL5-S2) 1 pc SPME performance evaluation mix
SPME Arrow Conditioning Module PAL3-SPME-ArrowCond		<ul style="list-style-type: none"> • For the conditioning of SPME Arrows and SPME Fibers prior to sample enrichment, max. 350 °C • Position for automated conditioning • Position for manual pre-conditioning • Automated purge gas valve • Manual gas valve for pre-conditioning • requires firmware version 2.3 or higher
Agitator Module PAL3-Agitator		<ul style="list-style-type: none"> • For the incubation and agitation of samples • 6 positions for 20 mL vials • Temperature range 40 - 200 °C • Agitation speed 250 - 750 rpm • Optional adapters for 2 mL or 10 mL vials

PAL SYSTEM

Ingenious sample handling



Contact the experts for sample preparation:



Or find your nearest [value added reseller](#).

For more information on PAL System visit:

www.palsystem.com



PAL is a registered trademark of CTC Analytics AG, Switzerland