



PAL Smart SPME Fibers Optimized for Automation



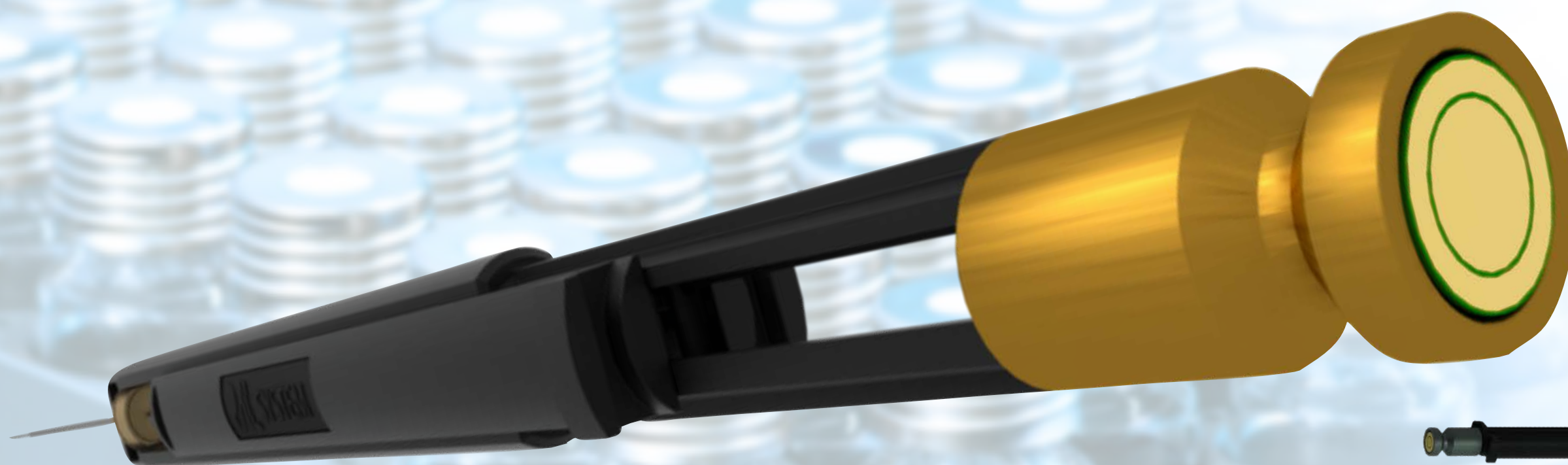
PAL Smart SPME Fibers

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

PAL 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.

Reference⁽¹⁾ 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

Polyacrylate Fiber, 85 μm

PDMS Fiber, 100 μm

PDMS Fiber, 30 μm

DVB / PDMS Fiber, 65 μm

PDMS Fiber, 7 μm

DVB / PDMS / Carbon WR - Triple phase Fiber, 80 μm (50 μm / 30 μm)

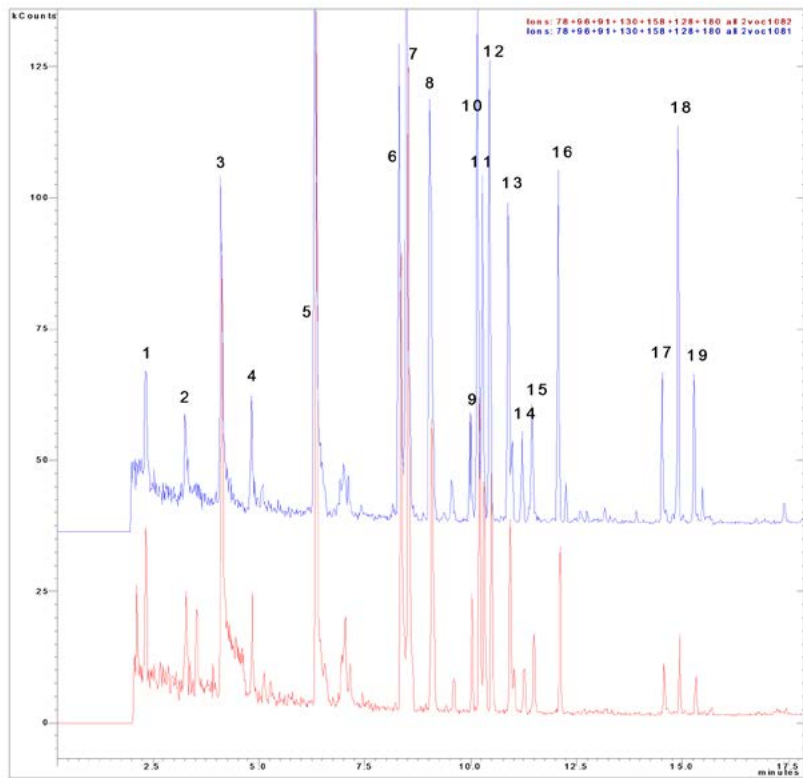
Carbon WR / PDMS Fiber, 95 μm



Find more information about [SPME Fibers](#)

Comparison of PAL Smart SPME Fibers with established SPME 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 SPME Fibers. For medium and high boiling compounds the PAL SPME Carbon WR Fiber in certain cases shows an even better performance than the established SPME Fibers.



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

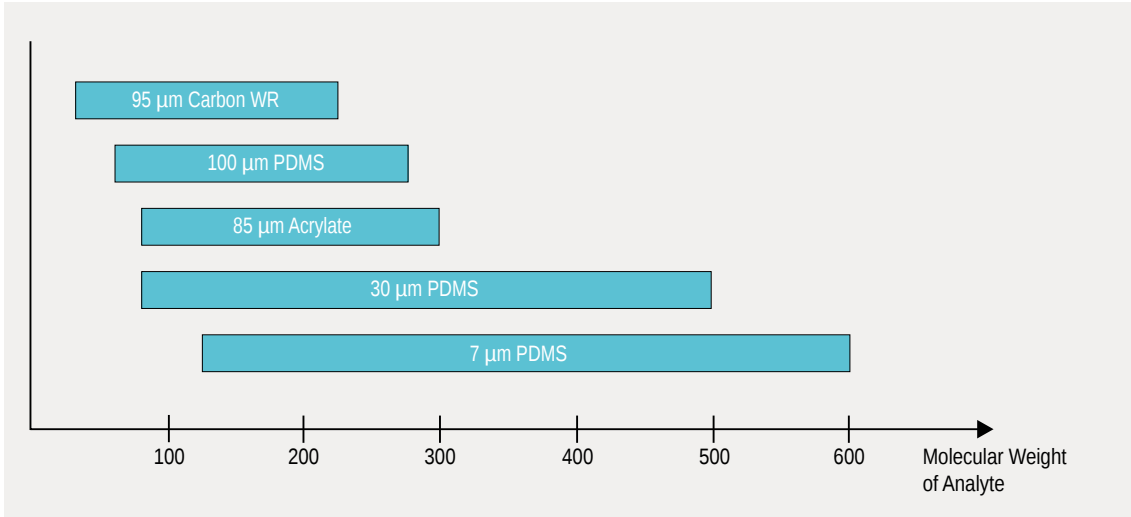


Fig. 2: Correlation between molecular weight of the analyte and the fiber type

Type of Analyte	Molecular Weight	Recommended SPME 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 SPME 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

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

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

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

Note: The 100 µm and 30 µm PDMS coated SPME Fibers cannot be used with hexane.

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

- No more manual fiber exchange needed
- Maximum fiber protection

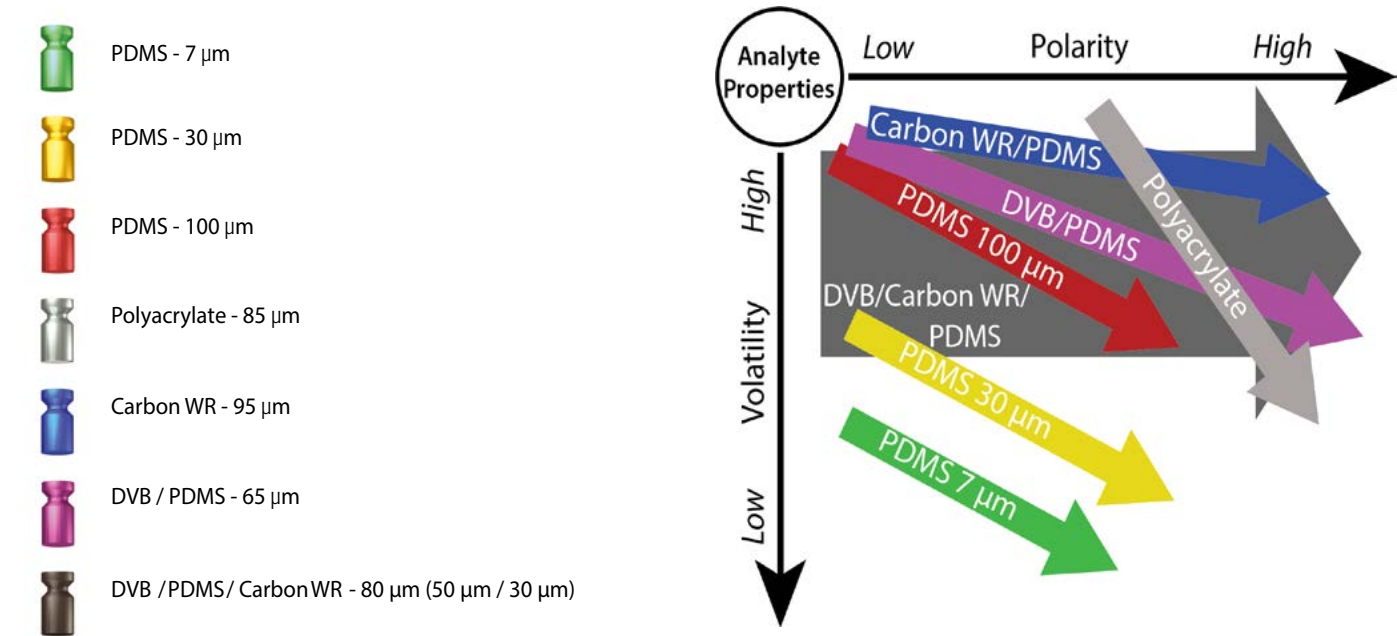


Fig. 3: Color Code for easy optical identification of coating type and thickness

PAL Smart SPME Fiber Ordering Information

No.	Phase Thickness	Color Code	Set of 1 Smart Fiber Part No.	Set of 3 Smart Fibers Part No.	Set of 5 Smart Fibers Part No.
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

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

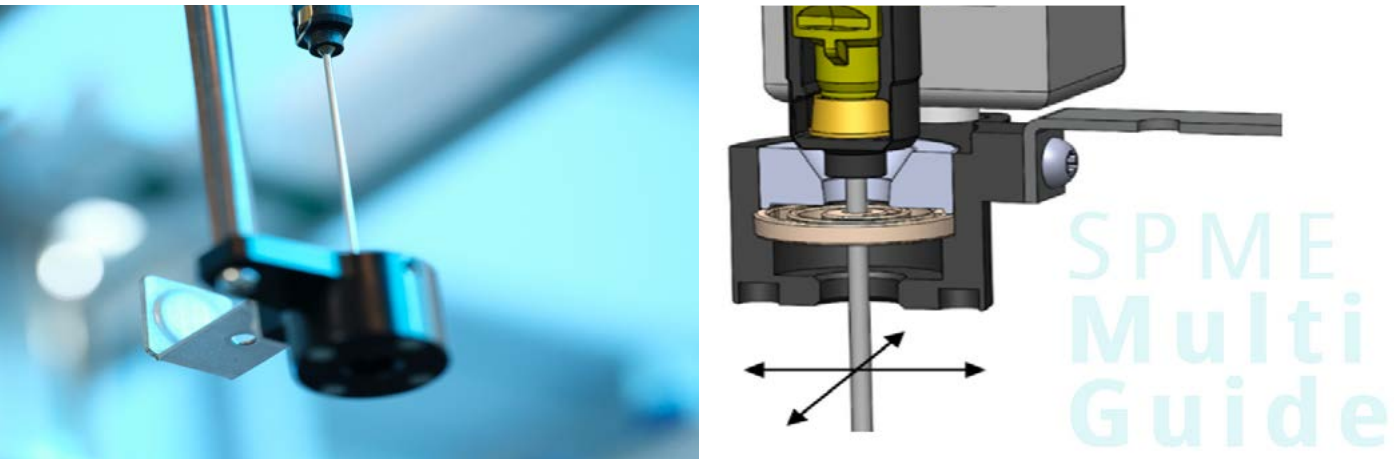
PAL Smart SPME Fibers can be used for a wide range of GC and injector models and are fully backward compatible with non Smart SPME Fibers any generation of PAL3 Systems.

New: Introducing the SPME MultiGuide

SPME Fiber Tools can now be upgraded for using 1.1 mm SPME Arrows. This is now possible using the SPME MultiGuide (PAL3-SPME-MG).

Installation of the SPME MultiGuide on a SPME Fiber Tool is simple, and compatible with all existing SPME methods on any generation of PAL3.

The SPME MultiGuide lowers the initial costs of a SPME Arrow drastically, making it accessible for more laboratories.



PAL Smart SPME Fiber Accessories

Smart SPME Kit PAL3-SPME-SFib-Kit		Smart SPME Fiber Kit, consisting of: 1 pc SPME Fiber Tool 1 pc SPME Fiber Assortment Kit (SFIB-SEL5-S2) 1 pc SPME Performance Evaluation Mix
SPME MultiGuide PAL3-SPME-MG		SPME MultiGuide to be used for: • Upgrade of PAL SPME Arrow Tools for extractions in the Agitator • Upgrade of PAL SPME Fiber Tools to use 1.1 mm SPME Arrows NOTE: GC Liner and Injector Adaption for SPME Arrow is not included Transport of 2 ml vials is not supported with the MultiGuide.
SPME Arrow Conditioning Module PAL3-SPME-ArrowCond		• 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•
Agitator PAL3-Agitator		• 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 (PAL3-Agi-InsSet-2ml / PAL3-Agi-InsSet-10ml)

System Requirements to use SPME technique with a PAL System:

PAL RTC or RSI with firmware 2.3 or higher and PAL SPME Fiber Kit (PAL3-SPME-SFib-Kit)
For Smart functionality FW 3.n or higher and PAL RTC/RSI Series II are required.

An Agitator is requested for temperature controlled extractions and speeding up the equilibrium process. A second optional module is the SPME Arrow Conditioning Module, wich 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 SPME 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.

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