

SPDE™

The Magic Needle

The Solid Phase Dynamic Extraction (SPDE™) option features full automation for dynamic sample extraction, desorption and analysis. Liquid and headspace samples are not only easier to analyze, but handling is much more reliable than when employing regular SPME procedures.

The SPDE™ technology allows you to dynamically extract samples due to the fact that it uses significantly high amounts of sorbent material (4.5µL). It also has a large surface area with fast sample flow (turbulent flow) over the active coating, thereby ensuring short extraction times.

- ▶ No extra Thermal Desorption System needed
- ▶ Total control of all extraction parameters such as sample temperature, sample flow through the phase, the number of dynamic extraction strokes inside the needle, etc.
- ▶ High-grade stainless steel capillary needle
- ▶ No mechanical and thermal stress
- ▶ Use of various phases and film thicknesses
- ▶ Less time needed for sample incubation

How does it work?

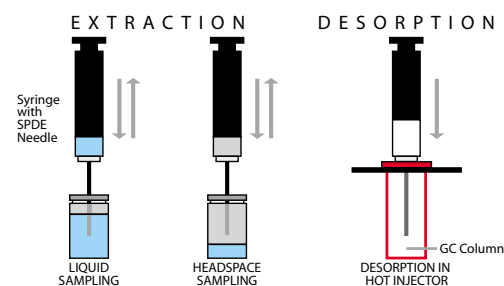
A gas-tight 2.5 mL syringe is equipped with a special needle that is coated on the inside with an extraction phase. The phase can be applied in variable thicknesses. The adsorption process is best described as follows: A liquid or headspace sample is drawn up into a 2.5mL syringe, thereby adsorbing analytes onto the stationary phase. A distribution balance is reached between the liquid sample matrix and the active phase. The analytes are concentrated onto the phase by repeatedly moving the plunger up and down, thereby forcing the headspace or fluid through the needle. Fast plunger speeds ensure a quick exchange of sample near the active phase.



Fig. 1. Combi PAL showing the Single Magnet Mixer (SMM) and purge station

System

- ▶ System for dynamic extraction of liquid and gaseous samples
- ▶ More convenient than other extraction methods
- ▶ Analyze a sample while extracting the next one
- ▶ Fully automated operation in combination with a standard CTC PAL system and a GC with Split/Splitless or PTV injector



After adsorption, the syringe picks up carrier gas from the fiber bakeout station (if necessary, the station also is used to dry the coating and syringe). Then, the autosampler moves the syringe over to the hot GC inlet, and the analytes are desorbed. Additional gas flow from the syringe forces the analytes into the inlet, thereby ensuring sharp peak shapes. This technique can be used with splitless flow for maximum sensitivity.



Fig. 2. SPDE™ Option Kit

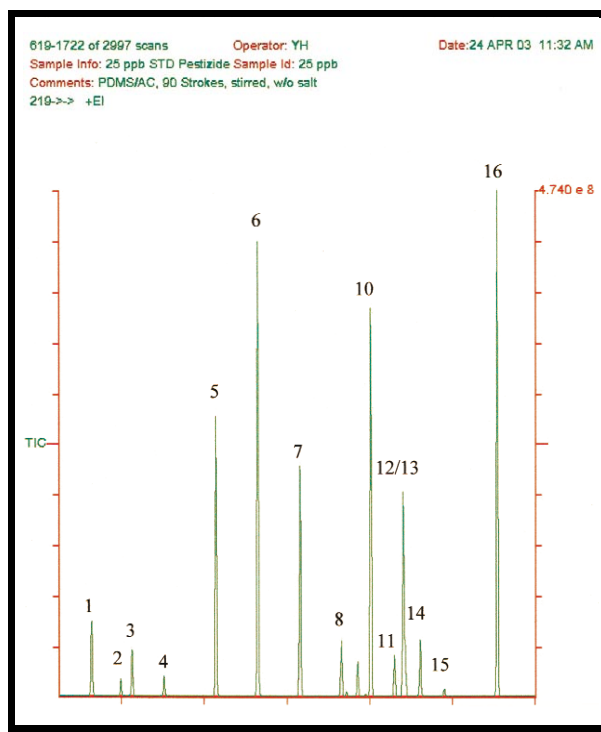
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Application Notes:

- Headspace Solid-Phase Dynamic Extraction (SPDE) and GC/MS/MS for the Determination of Amphetamines and Synthetic Designer Drugs in Hair Samples (SP 202)
- Determination of Amitraz in Honey with SPDE-GC-MS/MS (SP301 / SP301e)
- Determination of Pesticides in Drinking Water with SPDE-GC/MS (SP303 / SP303e)
- Quantitation of "Liquid Ecstasy" (Gamma-Hydroxybutyric Acid) by Solid-Phase Dynamic Extraction/GC-MS in Urine (SP 304e)
- Solid Phase Dynamic Extraction (SPDE) GC-MS for the Determination of Hydrophilic Compounds in Water (SP501E)

Literature:

- Automated headspace solid-phase dynamic extraction for the determination of amphetamines and synthetic designer drugs in hair samples, F. Musshoff et al., J.Chromatogr. A 958 (2002) 231-238
- Application of tandem mass spectrometry combined with gas chromatography and headspace solid-phase dynamic extraction for the determination of drugs of abuse in hair samples, D.W.Lachenmeier et al., Rapid Commun. Mass Spectrom. 2003; 17:472-478
- Automated headspace solid-phase dynamic extraction (HS-SPDE) to analyse the volatile fraction of food matrices. Bicchi et al. J.Chromatogr. A 1024(2004, 217-226)



SPDE Application: Pesticides in drinking water

Description	Part Number
SPDE Option with SMM (heated version) 1 syringe, 2 coated needles and purging station Requires Cycle Composer, small mixing bars and PAL TraySet 20 mL	PAL SPDE Opt-20
SPDE Option with SMM (Peltier version) 1 syringe, 2 coated needles and purging station Requires Cycle Composer, small mixing bars and PAL TraySet 20 mL	PAL SPDE Opt-P
SPDE syringe 2,5 mL, RN-type (removable needle tip)	SPDE-Syr204250
SPDE Needle with phase coatings: removable needles available in 2 lengths: standard 56 mm or 74 mm for use with SPDE Extraction Cooler only	To order long needle: change ending # to 74
Needle, PDMS, 50 µm, 56 mm (or 74 mm)	SPNdl-1-50-56 (74)
Needle, PDMS/activ charcoal, 50 µm, 56 mm (or 74 mm)	SPNdl-1/AC-50-56 (74)
Needle, PEG (Carbowax), 50 µm, 56 mm (or 74 mm)	SPNdl-WAX-50-56 (74)
Needle, CT 5 (5 % Diphenyl / 95 % Dimethylsiloxan), 50 µm, 56 mm (or 74 mm)	SPNdl-5-50-56 (74)
Needle, 1701 (14 % Cyanopropyl / 86 % Dimethylsiloxan), 50 µm, 56 mm (or 74 mm)	SPNdl-1701-50-56 (74)
Needle, OV 225 (25 % Phenyl-25 % Cyanopropylmethylsilicon, 50 % PDMS) 50 µm, 56 mm (or 74 mm)	SPNdl-225-50-56 (74)

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