

TOTALLY INNOVATIVE MULTIMODE AUTOSAMPLER NEW KONIK ROBOKROM®



ROBOKROM® 1

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KROM+MASS



ROBOKROM® 2

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+8 OPERATIONAL MODES

- HRGC+HRGC-MS
- HRGC+HPLC-MS
- STATIC HEAD SPACE
- PURGE & TRAP
- SMPE
- FRACTION COLLECTOR
- SAMPLE PREPARATION
- ... and THERMAL DESORPTION

ROBOKROM® 3

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MAIN FEATURES

- X-Y-Z Displacements.
- Symmetrical Horizontal Arm: Microcontroller can be located at either side.
- Vertical Arm: holds the needles and all syringes.
- 3 Interchangeable Vial Trays: for 32 Vials of 6, 10 or 20ml, 105 Vials of 2ml and 171 Vials of 1ml.

ROBOKROM® 4

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MAIN FEATURES

- Optional Tray Temperature Control (TTC): all vials can be heated or cooled from 5°C to 70°C in stand-by mode.
- Easy Menu Driven Interactive Programming or through KoniKontrol® Software via Konikrom 32® Software.

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HRGC AND HPLC AUTOSAMPLER

- Accepts a wide range of syringes from 0,5 to 500µl.
- Programmable injection volume (from 0,1 to 500µl).
- Injection with solvent or air plug before and after the sample injection
- Programmable plunger speed from 1µl/s to 5ml/s depending on the syringe type. Handles wide range of sample viscosity.

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HRGC AND HPLC AUTOSAMPLER

- Adjustable plunger speed for syringe cleaning and injection.
- Programmable needle introduction speed for septum protection.



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HRGC AND HPLC AUTOSAMPLER

- Pre and post cleaning with different solvents.
- Free from carry-over effects.
- Pre-column derivatization.
- Internal standard addition.
- Dual channel/double injection: same or different samples.
- HPLC: fixed loop or programmable from 0.1 µl to 500 µl.

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ROBOKROM® AUTOSAMPLER WITH ACCESSORIES



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STATIC HEAD SPACE

Theory

- Analysis of the vapour in equilibrium in a sample kept in a closed vial at constant temperature. Temperature range: from 40°C to 190°C.
- Solid or liquid samples are introduced in a sealed vial with an inert gas (at controlled pressure) in the head space.

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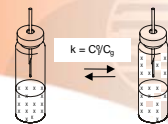
STATIC HEAD SPACE _ THEORY

- The system is kept at constant temperature during a fixed time until the volatile compounds reach the equilibrium between the matrix and the head space.
- A fixed volume of the head space is transferred to the GC injector through the proper heated line.

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STATIC HEAD SPACE _ THEORY



$$C^0_l = C_g (P_t/P^0_a Y_a/X_a + V_g/V_l)$$

$$C_g = C^0_l/k$$

where:

C^0_l : initial concentration

C_g : product concentration in vapor phase

P_t : total pressure

P^0_a : vapor pressure of compound A at working temperature T1

Y_a : vapor phase in equilibrium concentration

X_a : condensed phase in equilibrium concentration

V_g/V_l : volume ratio liquid / vapor phase

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STATIC HEAD SPACE _ THEORY

Vapor phase concentration will be higher when:

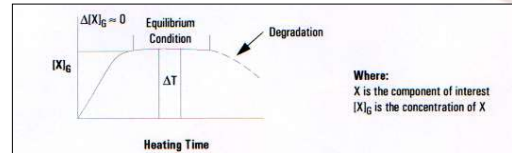
- When P^oa is higher: temperature proportional.
- When the volume ratio V_g/V_i is lower.
- When total pressure is lower.
- In aqueous samples: increasing the ionic strength of water (by addition of inorganic salt)
- In non-aqueous samples by water-miscible: adding water to transfer the organic compounds from aqueous matrix to vapor phase.

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STATIC HEAD SPACE _ THEORY

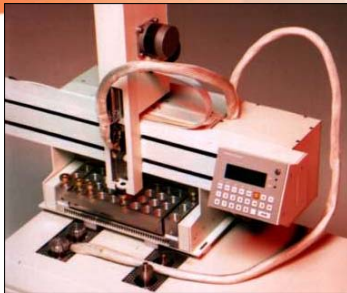
- Concentration vs. Desorption Time:



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ROBOKROM® IN STATIC HEAD SPACE MODE



ROBOKROM® 15



WHEN DO WE USE HEAD SPACE?

- When direct injection is not possible.
- When results are better than direct injection (depends on compound/matrix).
- Samples that need a previous extraction (alcohol in blood, water pollutants, etc.).
- When analyzing only volatile compounds (food, beverages, perfumes,...).

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WHEN DO WE USE HEAD SPACE?

Advantage

- The non volatile compounds are not introduced in the GC System.
- Better sensitivity.
- Sample preparation is not needed.

Disadvantage

- Quantification is done only in the vapor phase.
- Quantification problems (internal standard).
- Special equipment.

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ROBOKROM® : HS MODE

- Temperature Control in 3 different blocks: tray, pre desorption and desorption (up to 300°C)
- 32 vials of 6, 10 or 20ml
- Different Injection Volumes: Programmable Injection Time
- All temperatures and times programmable
- Magnetic Vial Movement

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ROBOKROM® _ HS MODE

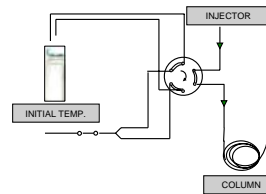
- Electronic Pressure Control (EPC) for vial pressurization
- Optional Sample Stirring
- Maximum Productivity with working cycle optimization
- Optional fixed loop sampling

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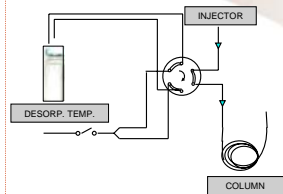


HS WORKING CYCLES

1. INITIAL



2. DESORPTION

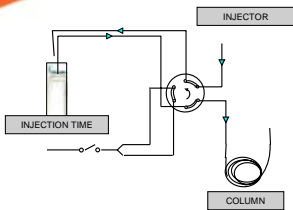


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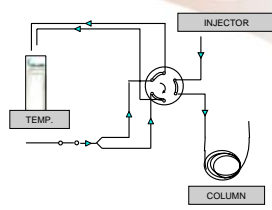


HS WORKING CYCLES

3. INJECTION



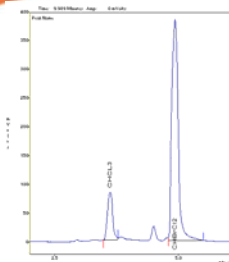
4. CLEANING



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TRIHALOMETANES IN WATER



SAMPLE	
Column:	0.5 µm THM
GC:	KOV-DB-624, 30m, 0.53mm, Sum (ref. 125-1334)
Carrier:	He constant flow 8 ml/min
Injector:	250°C, inj. mode, conventional injector
Oven:	50°C (1min), 150°C (min), 70°C (5min), 6°C/min, 150°C (1min)
Detector:	ECD 300°C, detector gases: N ₂ at 60ml/min
Temp.:	Sample at 15°C, ambient temperature
HeadSpace:	
Trap:	80°C
Flow:	100°C
Temp.:	160°C
Trap:	10min
Flow:	20°C
Cleaning:	He 8psi
gas:	

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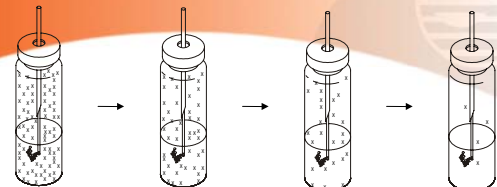
DYNAMIC HEAD SPACE (PURGE AND TRAP) _ THEORY

- Determination of volatile compounds in liquid samples.
- A sample volume is inserted into a sealed vial and a gas flow is bubbled through it.
- The outlet gas is trapped in the adsorbent (trap).
- The trap is desorbed transferring the compounds by means of the carrier gas through the GC system.

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DYNAMIC HEAD SPACE (PURGE AND TRAP) _ THEORY

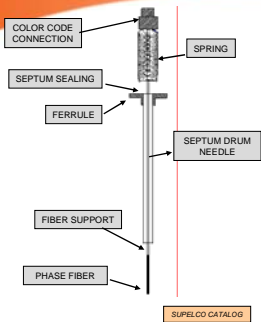


- Any compound has its vapor pressure
- Compounds migrate out of the solution to reach the equilibrium
- As the compound in the vapor phase are constantly get out due to the gas flow, the equilibrium is never reached (dynamic equilibrium)

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SOLID PHASE MICROEXTRACTION _ THEORY

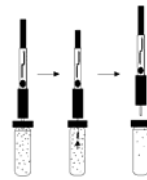


- Compounds are transferred from sample matrix to phase bonded fiber.
- The extraction is completed when the equilibrium between compounds in sample and fiber is reached.
- Equilibrium sample preparation method.

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SOLID PHASE MICROEXTRACTION _ THEORY



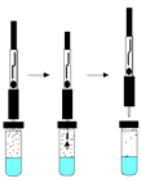
Direct Extraction - Immersion

- The fiber is in contact with the sample.
- The compound moves to the fiber where is adsorbed.
- The fiber is retracted and leaved to proceed to the desorption.

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SOLID PHASE MICROEXTRACTION _ THEORY



HS - SPME

- The fiber is in contact with the head space vapor.
- The compound moves to the fiber where is adsorbed.
- The fiber is retracted and leaved to proceed to the desorption.

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SPME AUTOSAMPLER

- 3 Interchangeable vial trays: for 32 Vials of 6, 10 or 20ml, 105 vials of 2ml and 171 Vials of 1ml.
- Optional Tray Temperature Control (TTC): all vials can be heated or cooled from 5°C to 70°C in stand-by mode.
- Syringe: Special fiber adapter.
- Fibers: all available fibers (PDMS, PDMS/Carboxen, PDMS/DVB, CW/TPR, CW/TVP,...)
- Working mode: Immersion / HS.
- Optional (32 vial tray): Sample Stirring and Heating.

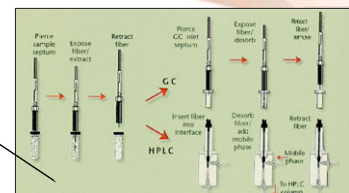
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SPME AUTOSAMPLER

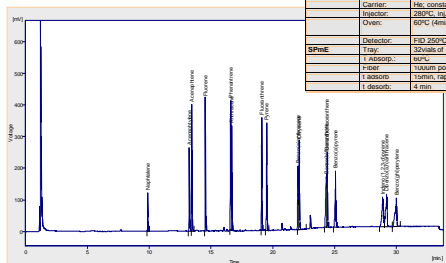


FROM SUPELCO CATALOG

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PAH IN WATER



SAMPLE	200ppb water spiked
GC	Column: KAP-1201, 30m, 0.25mm Carrier: He, constant flow 2 ml/min Injector: 250°C, split mode, Splitlessless (4-120) Oven: 60°C (4min); 10°C/min; 250°C (10min);
SPME	Detector: FID 250°C Temp: 30min at 100°C, ambient temperature I. Adsorb: 30min I. Desorb: 10min, rapid heating I. Desorb: 4 min

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FRACTION COLLECTOR AUTOSAMPLER

- Automatic and sequential sample collecting by time.
- 32, 105 or 171 collectors.
- Optional baseline monitoring (UV-VIS).
- Automatic waste collection.
- Vials of 1, 2, 6, 10 or 20 ml.
- Intelligent volume calculation.

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μSTATION AUTOSAMPLER FOR SAMPLE PREPARATION

- Automatic and sequential sample processing.
- Options: evaporation, concentration by volatilization, drying, concentration adjustment (controlled dosing of reagents, standards and/or solvents),...
- Utmost reproducibility, linearity, precision and accuracy. User Error free operation
- Reliable. Free from operator's errors.

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THERMAL DESORBER

- Purge & Trap with vial movement, heating and cryogenic option
- The Extraction cartridges are introduced in the 20 ml vials and heated up to 300°C.
- The inert gas transfers the desorbed compounds to the cryogenic trap.
- When the transfer is finished the trap is heated and the compounds are transferred to the HRGC system.

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