

GPC ULTRA

**Fully Automated Sample Preparation
for Online-Gel Permeation Chromatography
and for all Evaporation Processes**



Themes at a Glance:

- ⌘ Sample preparation system + Additional Benefit: Automated Concentrator
- ⌘ Automated GPC ULTRA: Main Characteristics – Benefits for the User
- ⌘ Sample preparation: GPC – Evaporation – Liquid Handling
- ⌘ Additional benefit: Automated Concentrator
- ⌘ System Components
- ⌘ Technical Data

**Sample Preparation System
+
Additional Benefit: Automated Concentrator**

The GPC ULTRA can be utilized for two application ranges without any modifications:

①

Automated gelchromatographic sample preparation system for the analysis of residues and contaminants via gaschromatography

Gelpermeation Chromatography inclusive Concentrator

The result is the concentrated sample and the aliquotation into different vials

②

Without any modification the system can be used as an

Automated Concentrator

for the sequential and individual concentration of organic solvents. Furthermore, the instrument features every process concerning concentration tasks.

Automated GPC ULTRA: Main Characteristics – Benefits for the User

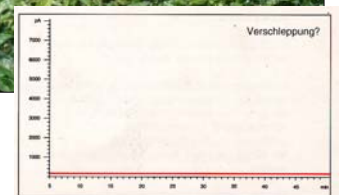
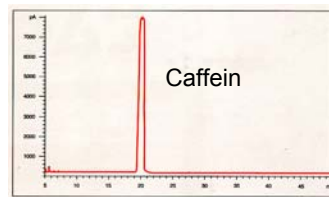
- ⌘ **Fully Automated Sample Preparation for the Modified DFG S19 Method, the EN 12393, EN 1528, AOAC Method No. 984.21, USEPA SW-846 Method 3640 A**
 GPC Ultra integrates the entire process from injection into the GPC system up to distribution of aliquots into various vials.
- ⌘ The system can be operated unsupervised. Consequently the capacity of the system can be fully utilised throughout the night. Up to 52 samples can be processed in one single sequence.



- ⌘ **Easy processing of Even the Most Complex Matrices**

The system is also perfectly suitable for complex matrices. Spices with a high content of pigments and aroma substances (e.g. chilli, mace) can be processed without any problem. Problems occurring with sedimentation matrices (potatoes, citrus fruit) can be avoided by programming the depth of submergence of the sample needle.

- ⌘ **Carry over Free Sample Processing**
 Intensive and efficiently designed rinsing processes wash out contaminants by using a minimum of solvent. So far, carry-overs from sample to sample could not be detected in GC systems.



- ⌘ **Reproducible Results with High Recovery Rates**
 Important features of GPC ULTRA include extraordinary reproducibility of results and high recovery rates. Both features are the result of a well-designed system.



≡ **Safe and User Friendly**

The system design is particularly considerate of user protection. Sample vials and receptacles for fractions can be (but don't have to be) sealed with septa, such that solvent evaporation is reduced to a minimum. For this reason, the GPC ULTRA can be operated independent of an exhaust hood. In addition, sealing with septa prevents evaporation and, consequently, the unintended concentration of the samples, e.g. prior to their transfer into the GC.

≡ **Simple and Comfortable Operation**

Once the system is installed, GPC ULTRA is ready to be used in routine operation. Daily chores include only the control of the filling level of the solvents and emptying the waste and reservoir.

≡ **Robust for operation without supervision**

The system was developed for the fully automated operation in the laboratory. Consequently, this system can also be used for "overnight runs". GPC ULTRA has been designed with a particular view to robustness and low maintenance, and all common solvents can be utilised. The system is self-cleaning and quiet. The operation is menu-controlled and therefore incredibly simple.

≡ **Reliable - Durable - Quiet**

The system is designed to be particularly robust such that withstand continuous operation. User compliance to the operating and care instructions ensures that the maintenance cost is extraordinarily small.

≡ **GPC ULTRA – a Stand Alone Concentrator**

GPC ULTRA can be used as an evaporation system without any GPC-clean-up-step. The system is especially suitable for sample series, which can be processed one after the other. Such series are found in analytical laboratories.

GPC ULTRA processes fully automatically up to 52 samples one after the other - sequentially and individually. The ideal application is the **reproducible concentration** of samples to a **defined end volume of 5 mL**.



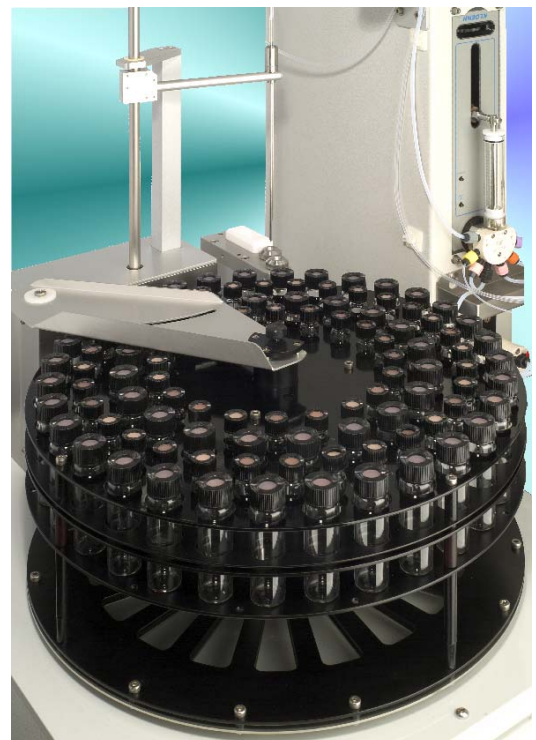
Laser controlled vacuum chamber

Sample Preparation System GPC – Evaporation – Liquid Handling

The functional process of the system is geared to the modified modular extension of the modified DFG S19 multi method (§ 35 00.00-34 L). GPC ULTRA is including the complete process from the sample extract via the GPC column with online vacuum concentration to the aliquotation of the precisely concentrated volume (5 mL) into different vials. If necessary, an automated solvent exchange is also possible.

GPC ULTRA Thereby Automates the Following Steps:

1. Injection of the sample (26 or 52 in series) via robot needle and sample loop onto the GPC column
2. Cleanup of the sample via gel permeation chromatography (GPC)
3. Transfer of the main run into a laser controlled vacuum chamber
4. Online concentration of the column eluate with vacuum, final volume control and precise fill-up to 5 mL
5. Aliquotation in up to three vials
6. Rinsing of needle loop, ports, vacuum chamber, and all tubings



Automated Concentrator

The new GPC ULTRA from LCTech processes up to 52 samples **sequentially and individually**. The suitable range of applications is a reproducible concentration of samples from sample vials to a defined final volume.

The system is especially suitable for samples that can be processed in series. These will be found in analytical laboratories.

The system is ideally suitable for areas of sample preparation with organic solvents, such as

- ⌘ the sample preparation in pesticide analysis,
- ⌘ within the H53 method (DIN EN ISO 9377-2)*,
- ⌘ the analysis of PCB in environmental samples*,
- ⌘ and other labour intensive concentration steps.

* recommended final volume 1 mL in each case

GPC ULTRA Automates the Following Steps Amongst Other Things:

- ⌘ Concentration of any volume ($V < 250$ mL) to a precise final volume of 5 mL to 15 mL
- ⌘ Simple solvent exchange
- ⌘ Quantitative transfer of the concentrate into the initial vial for further cleanup purposes
- ⌘ Multiple solvent exchange
- ⌘ Concentration to dryness and subsequent dissolution
- ⌘ Dilution of the concentrate
- ⌘ Aliquotation of the concentrate into sealed vials
- ⌘ Process for samples with internal standard
- ⌘ Speed-up processes for a faster sample preparation



The Sample Preparation System GPC ULTRA Contains the Following Components:

1. Display with Touch-Pad

A four-lined display with touch pads enables the system to operate in a stand-alone-mode. The menu-driven input is self-explanatory and facilitates system operation.

2. Liquid Handling-System

A precise swivel arm robot in combination with a spring mounted needle and needle loop, respectively, and an inert 10 mL syringe transfers the liquid within the system.

Besides the eluent of the gel column, there are three more connections for different solvents.

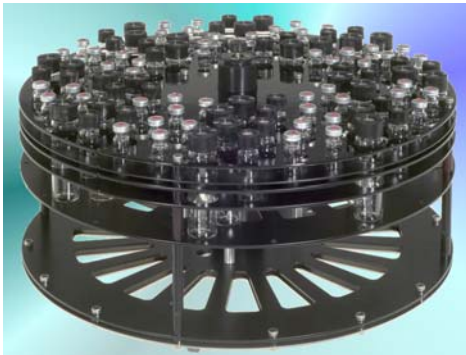
All resulting waste will automatically be transferred to a waste container.
All necessary system rinsing duties will be performed by the same components.

3. Vacuum Chamber with Vacuum Pump

In a heated and rotating vacuum chamber samples are either online concentrated to a defined final volume and transferred into vials after the GPC, or samples that only have to be concentrated can be processed with every requirements regarding concentration tasks.

In both cases the control is performed by two precisely adjusted lasers. The inert membrane vacuum pump from VACUUBRAND makes the newest technologies in the area of membrane pumps available. The pump may be operated in either control or automatic mode; interacting with both lasers in the vacuum chamber, it provides an optimal performance of the vacuum process.

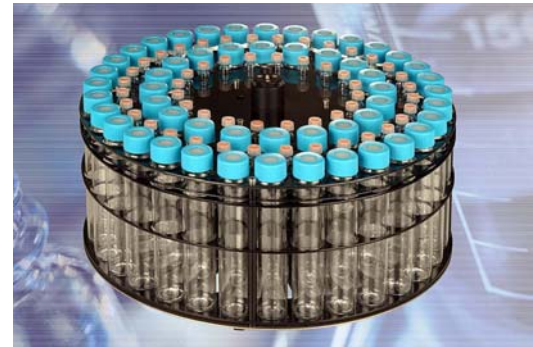
4. Sample Racks (optional)



For the gel chromatographic online concentration there are two racks with 26 and 52 positions available, respectively. In the first case the concentrate can be transferred into two GC- and one 4 mL vial, in the second case only into a 4 mL vial with screw cap.

For concentration tasks only, the system can be loaded with up to 52 positions with 60 mL or 26 positions with 110 mL or

12 positions with 250 mL. For the concentrate there are 1 mL autosampler vials or 16 mL vials available.



5. GPC Pump

The system contains a robust PLC-controlled double piston preparative pump (adjustable from 0,40 – 40,00 mL/min), which has hundredfold proven to be reliable under continuous operation.

The pump flow rate is adjustable; the pulsation is less than 1 %.

Over- and low pressure shut-off is integrated as standard.

The pump is solvent resistant and has a low-maintenance.

6. GPC Column (optional)

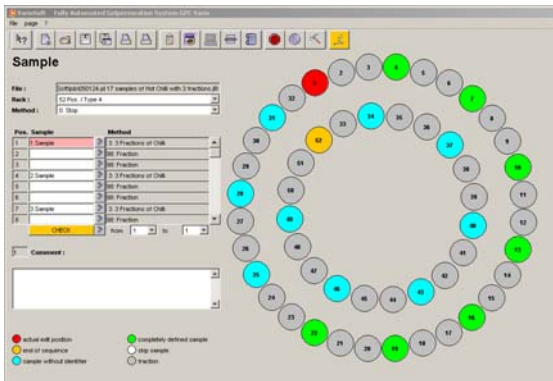
Refillable, DIN-compliant special column (filled or unfilled); materials subjected to wetting with solvents are glass and PTFE, 1/8"-PTFE tube at inlet and outlet site, rigid PTFE-base and adjustable plunger, stable construction, high overpressure stability, wearing parts are individually available. The gel filling typically is Bio-Beads, Type S-X3, 200-400 mesh.

7. Fixed Wavelength UV Detector (optional)

The UV detector offered by LCTech is optimally suitable for utilization with the LCTech software VarioSoft. It is a 254 nm fixed wavelength detector, which is tuned for the quality assurance of GPC columns.



8. Software VarioSoft (optional)

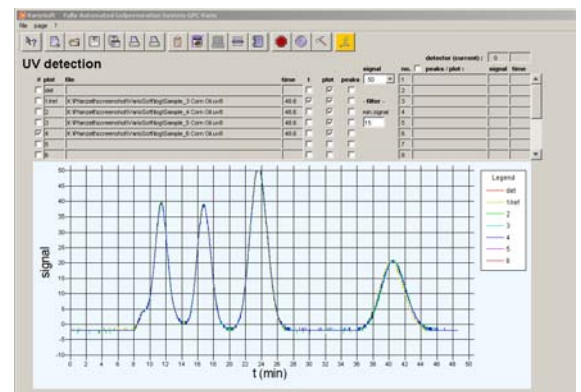


The LCTech PC-software VarioSoft provides a comfortable solution for the control of the GPC VARIO system.

Process parameters can be, visually assisted, pre-selected and stored. A sample processing list can be created and stored offline as a job list.

Facing the control at the system, now an essential extension is the definite correlation of sample

identification and job list (consecutive and non-manipulable sample ID). Protocols of the results can be exported as ASCII-files. Sample information such as laboratory internal identification, customer data or information regarding sampling and sample origin (free text input), respectively, can be read in via barcode reading. Admission to the system is password secured via a multi-level authentication hierarchy



The Software can also be used for the integration of an UV detector for quality assurance. A fixed wavelength detector (254 nm) is recommended. Simple chromatograms will be generated, that can be used for the evaluation of the system performance. Windows 98 or higher is required. A free disk space of about 100 MB will be needed for the software on the hard drive.

The VarioSoft software is not essential for operation of the GPC ULTRA, but is recommended for demanding customers. The software is mandatory, when it is intended to use a UV detector for quality assurance.



9. Chiller (optional)

An optimized high-performance chiller is available for the GPC ULTRA, which provides a virtually complete solvent recovery in combination with the full jacketed condenser. The operating temperature may be adjusted to the corresponding tasks.

10. Modem (optional)

The software update or support from LCTech is quickly and inexpensively available via modem. In this way, service costs can be dramatically minimised in the long run.

Technical Data of the GPC ULTRA Sample Preparation System

Ambient temperature (operational)	+10 ... +40 °C
Relative humidity (operational)	0 ... 95 %
Connection data:	
Power supply	230 VAC ± 10 %
Fuse protection	10 AT
Max. rated output	1 kW
Communication interfaces	For terminal and system control one RS 232 for each; suitable for remote service
Vacuum unit:	
Max. suction performance	0,8 m ³ / h
Pressure range	Atmosphere ... 2 mbar
GPC Pump:	
Type	Double piston
Flow rates	Analytic: 0,10 – 9,95 mL/min Preparative: 0,40 – 40,00 mL/min
Pressure	40 bar
Measures and weight:	
Measures (W x D x H)	750 x 600 x 1000 mm
Weight (operational)	ca. 110 kg



Would you like a quotation?

We are pleased to offer you the new and innovative LCTech analytical preparation system. General, technical or sales enquiries may be directed as follows:

Phone: 01420 549922

E-Mail: mail@arcsciences.com

FAX: 01420 84254

Internet: www.arcsciences.com