Science Together

KNAUER

SONNTEK, INC.

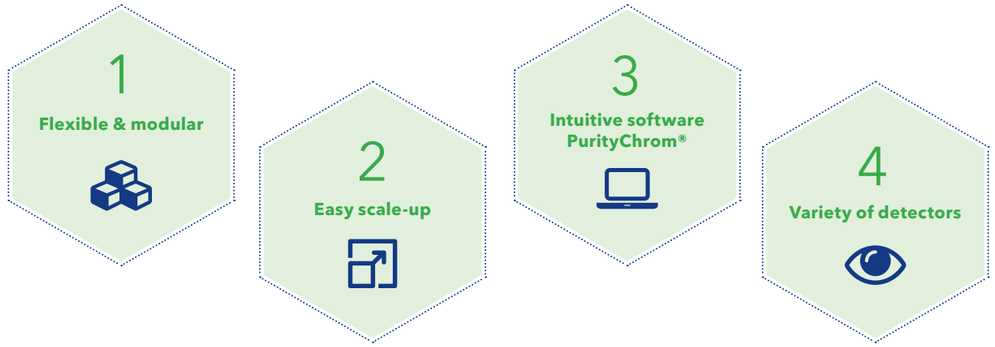
AZURA® Bio purification

Extensive and flexible FPLC solutions

KNAUER protein purification
The flexible FPLC platform

AZURA® Bio purification systems

Complete solutions for FPLC on a minimum footprint: AZURA FPLC systems combine flexibility and reliability. The biocompatible/metal-free FPLC is the perfect choice for your protein purification task.



Design your AZURA Bio purification system to your needs. Multiple functionalities such as automatic sample injection via autosampler, column switching, buffer and sample selection as well as fraction collection enable the user to automate the purification process.

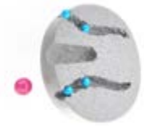
A large range of different detectors make your target molecules visible. Different flow rates and compatibility to columns from all vendors offer maximum flexibility. The intuitive software PurityChrom® combines all the advantages of a versatile purification software.

Fast Protein Liquid Chromatography (FPLC)

FPLC is a liquid chromatographic method for purification of large biomolecules like proteins. External factors like high temperature, high pressure, extreme pH, or solvents can disturb the protein structure and are therefore avoided in FPLC. Besides, the method uses column materials out of agarose or polymer material which are very sensitive against pressure fluctuations and air bubbles. **We designed our systems to meet your purification challenges!**

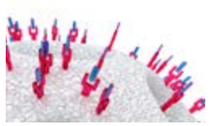
AZURA® Bio purification: You choose the method

Size Exclusion Chromatography (SEC)



Separate according to size.
See page 22 for a specialized AZURA system for SEC.

Affinity Chromatography (AC)

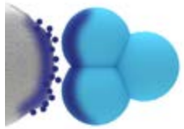


Specific binding of protein of interest.
See page 23 for a specialized AZURA system for AC.

Ion-Exchange Chromatography (IEX)

Separation takes place according to the charge of the protein and gradient elution.

Hydrophobic Interaction Chromatography (HIC)



Separation is performed based on hydrophobic interaction and gradient elution.

Purification strategy: Often a sequence of different methods is used in purification.

Capture → **Intermediate** → **Polishing**

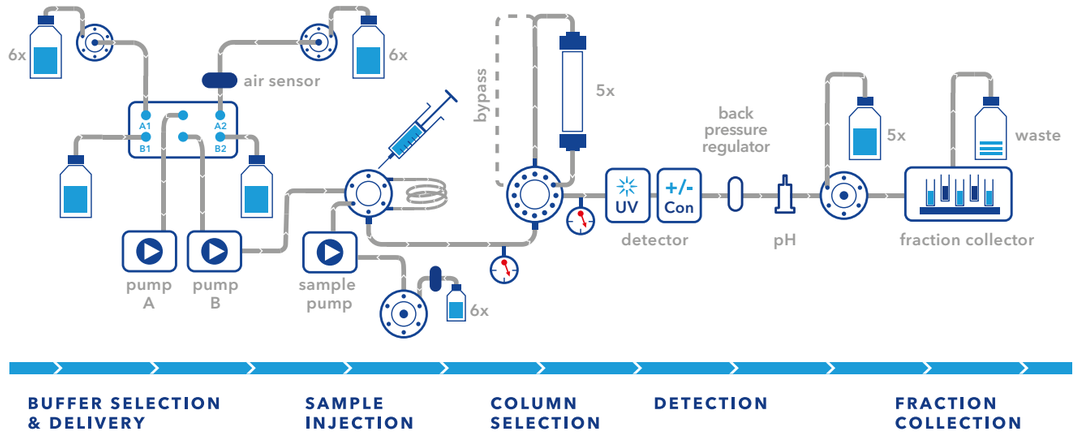
Normally a combination of methods is used in protein purification.

- The “capture” step purifies the protein from the crude extract.
- The “intermediate” step removes further contamination.
- The aim of the final “polishing” step is to get rid of all remaining impurities in order to gain a highly purified product.
- Automatization of two purification steps is possible using the especially designed AZURA Two step purification system (see page 24).

AZURA® Bio Lab purification system

From simple to complex, from lab to pilot scale: Design your AZURA® FPLC system according to your purification task!

AZURA Bio Lab allows you to create FPLC systems with highest independence. Just pick your modules and build-up the system yourself. Continue flexibility with intuitive PurityChrom® software.



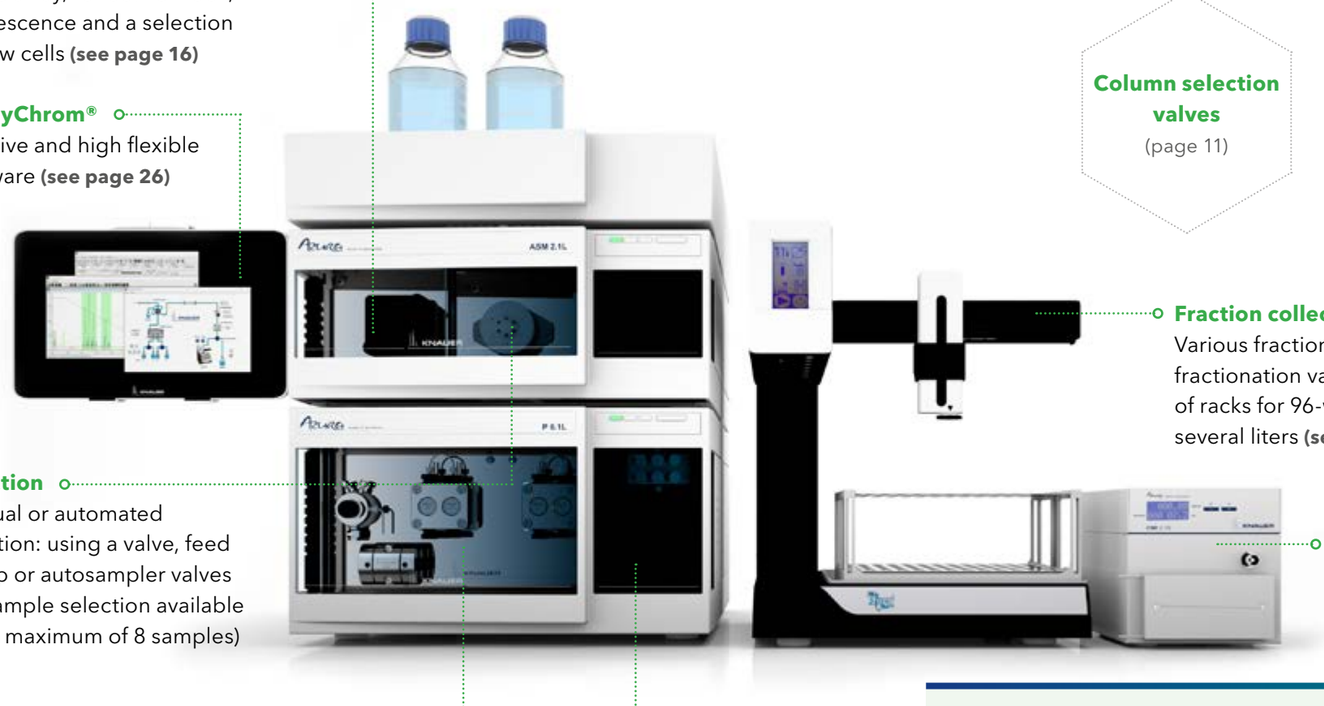
All common FPLC methods are supported.

All columns are supported.

Cold-room operation is supported.

Detection
Various detectors: UV/VIS, diode array, refractive index, fluorescence and a selection of flow cells **(see page 16)**

PurityChrom®
Intuitive and high flexible software **(see page 26)**



Injection
Manual or automated injection: using a valve, feed pump or autosampler valves for sample selection available (for a maximum of 8 samples)

Buffer delivery
Quaternary, binary pumps with flow rates up to 10 ml/min or 50 ml/min **(see page 6)**

Buffer selection
Integrated buffer selection valve for 4 buffers, extra buffer selection valves available **(see page 6)**

Fraction collection
Various fraction collectors and fractionation valve and a selection of racks for 96-well-plates up to several liters **(see page 18)**

Conductivity
With pH option **(see page 16)**

Column selection valves (page 11)

Sepapure® FPLC columns (page 11)

Automate your purification (page 20)

Scale-up from lab to pilot

Choose the Pilot series if you want to increase your productivity even more. Upscale our Lab configuration with same flexibility, software PurityChrom® but minimal footprint. Just transfer and upscale your methods. Flow rates up to 1000 ml/min and loads up to several grams are possible. **Find more information: www.knauer.net**

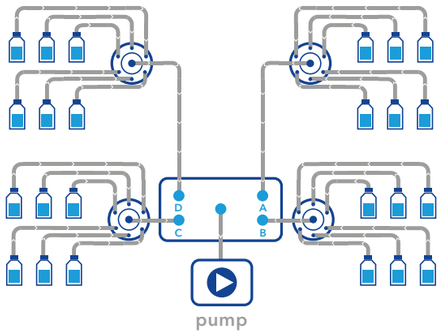
Configure your AZURA Bio purification system
Find all FPLC products on the following pages.

Buffer delivery

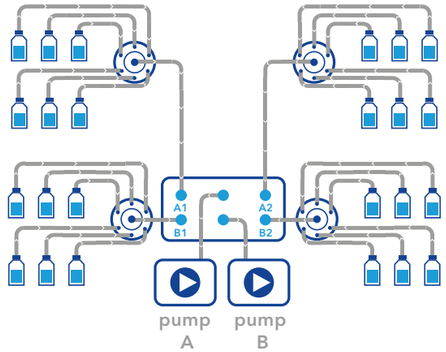
Precise and reliable pumps covering a wide flow rate range, gradient and buffer selection options.

Buffer selection

Automated switching between buffers is important for method development, column cleaning and regeneration. The pump P 6.1L features a build-in 2 x 2 buffer selection valve (A1, A2 and B1, B2) or 4 x buffer selection valve (A, B, C, D).
You can extend buffer selection with additional valves each for up to 8 buffers.



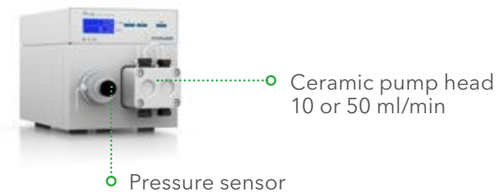
AZURA pump P 6.1L LPG - Quaternary gradient



AZURA pump P 6.1L HPG - Binary gradient

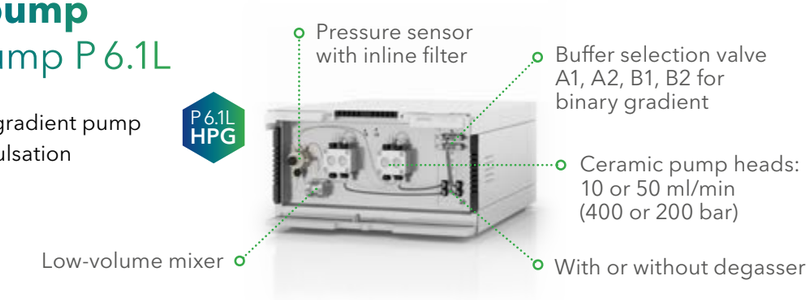
Compact pump
AZURA® Pump P 4.1S

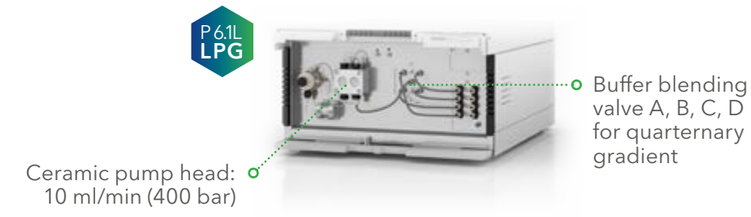
Isocratic pump with small footprint for dedicated applications or sample loading.



Gradient pump
AZURA® Pump P 6.1L

High-performance gradient pump optimized for low pulsation

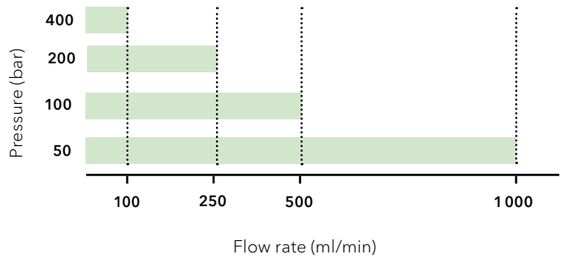


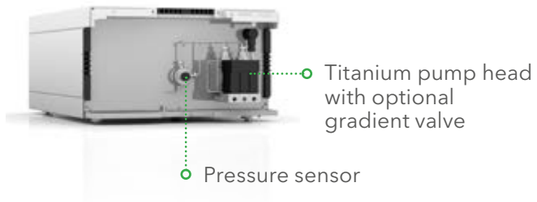


Let the pump mix your buffer.

Scale-up pump
AZURA® Pump P 2.1L

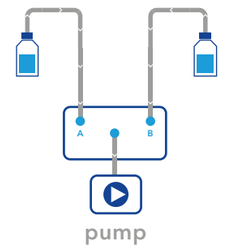
Pumps for high flow rates



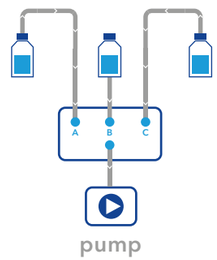


Gradient options

From binary to quaternary gradient, with additional P 2.1L pumps or cost-effective binary low pressure gradient (2 × 1 buffers, up to 800 ml / min) or ternary low pressure gradient (3 × 1 buffers, up to 220 ml / min).



Binary low-pressure gradient



Ternary low-pressure gradient

Binary or quaternary gradient?

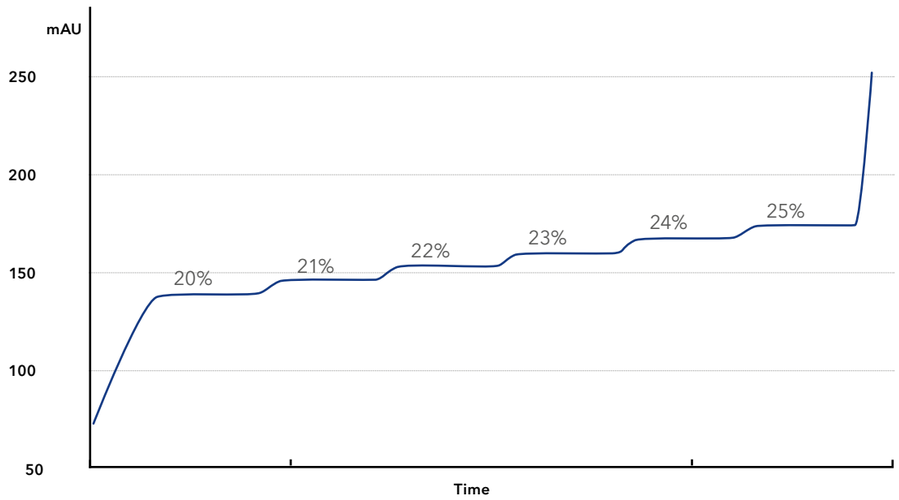
A quaternary low pressure gradient (LPG) module* dynamically composes the buffer on the inlet-side or low pressure side of the pump head, by quickly switching the selection valve between the different channels. The buffer in a binary high pressure gradient (HPG) system is composed by combining the flow of two pumps.

Quaternary gradient

- Low investment costs
- Limited flow rate range
- Channel usable for sample injection
- Gradient accuracy absolutely sufficient for FPLC

Binary gradient

- Less wear
- No flow rate limitation
- Sample pump for sample injection (recommended)
- High accuracy for special application



Excellent gradient reproducibility of 0.3 % RSD. overlay of 6 repetitions at 1 ml/min run with pump P 6.1L low pressure gradient version

*For higher flow rates available as ternary or binary gradient (see page 7).

AZURA® ASM 2.1L Assistant

A flexible combination module

The assistant ASM 2.1L is a compact combination module which can be equipped with up to three device modules. Available for selection are valves, pumps, and a UV detector. An assistant including a pump, valve, and detector features a compact FPLC system, like AZURA Bio SEC or AZURA Bio AC. As a part of a larger system, the ASM 2.1L is extremely versatile. Depending on the integrated modules the assistant fulfills many different tasks like sample and buffer selection, sample injection, column switching, fraction collection, buffer delivery or UV-detection.

The concept of the flexible combination of device modules combines the highest functionality with minimal space requirements.

Configure your assistant

Can be equipped with combinations:
valves, pumps, and one detector

Valves
For buffer and sample selection, sample injection, column selection, fraction collection, automation and multiple switching tasks (the multifunctional selection valve is mounted laterally of the assistant)
(see page 6, 8, 9)

UV-Detector UVD 2.1S
Variable single wavelength
(see page 16)

Compact pumps P 4.1S/P2.1S
Up to 10 ml/min or 50 ml/min
(see page 6)

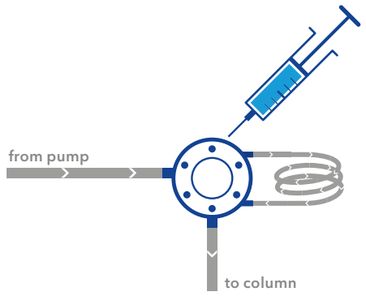
For detailed information on device modules and assistant configuration: www.knauer.net

Sample injection

Choose between manual or automated sample injection. Available modules include injection valve, sample pump, or autosampler.

Injection valve

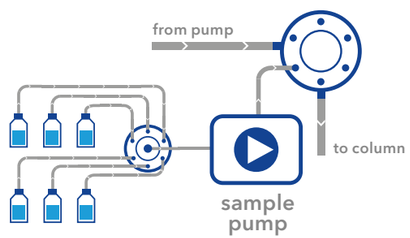
Integrated into assistant or standalone module: The AZURA 2-positions valve is perfect for injection of small sample volumes. Connect 1/16" tubings for flowrates up to 100 ml/min. For higher flowrates use the injection valve for 1/8" tubing. Various sample loops are available.



Sample pump

Integrated into assistant or standalone module: The AZURA P 4.1S is perfect for injection of larger sample volumes.
Repetitive sample injections by using the pump for automated sample loop filling.

Do you have many samples?
You can extend your configuration with additional valves each for up to 8 samples.



Autosampler

Process many different samples fully automatically with the Autosampler AS 6.1L.

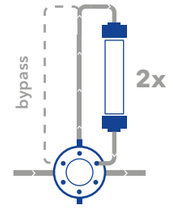
- Up to 10 ml injection volume
- From microtiter plates to standard vials
- Active cooling
- Fully supported by PurityChrom® software
- Metal-free

Column selection

Different options for column selection are available.

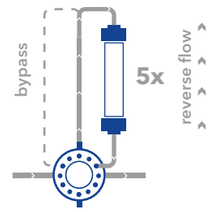
2-position valve

- Select two columns or one column and one bypass
- Flow rates up to 500 ml/min possible



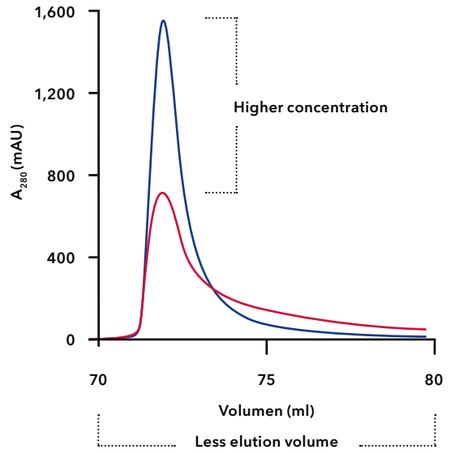
Multifunctional selection valve

- For up to 5 columns and 1 bypass
- Reverse flow
- Flow rates up to 50 ml/min



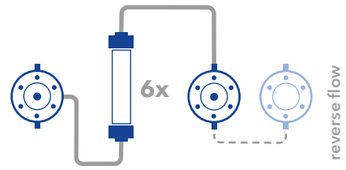
Why is the reversed flow option popular in affinity chromatography?
In affinity chromatography your target molecules will accumulate at the top of the column. Elution in the same direction dilutes your target molecule along the column. By elution with reversed flow you increase the concentration while decreasing the sample volume.

The option has two major advantages. Clean your columns more efficiently using reverse flow. By this you elute contamination the shortest way and minimize damage to the column.



Higher flow rates?

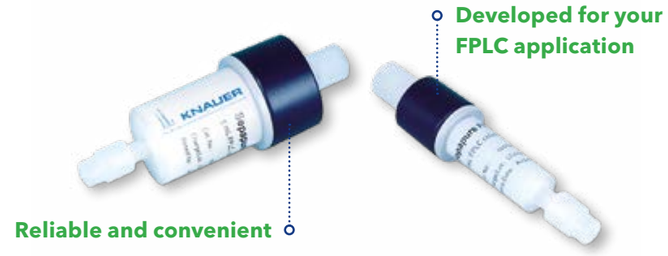
Use the column selection assistant to select six columns assuring a flow rate up to 500 ml/min. An additional valve allows to reverse the flow.



Sepapure®

Bio purification columns and media

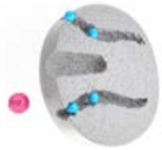
The perfect addition to any FPLC system



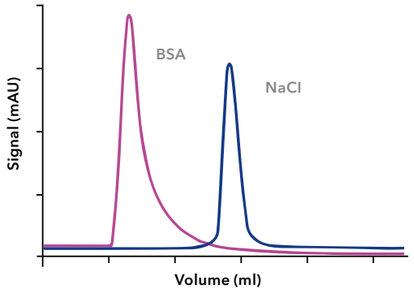
Size Exclusion Chromatography (SEC)

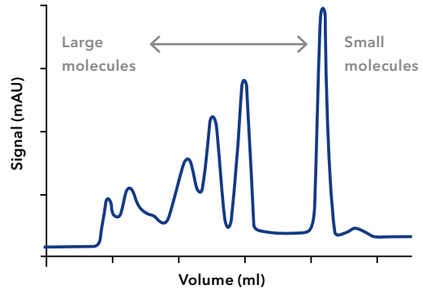
In size exclusion chromatography biomolecules are seperated according to their size. There are two different methods used in SEC which are defined by the matrix of the FPLC columns.

Group separation
Separation of small molecules from large molecules (e.g. **Desalting**)



High resolution separation
Separation of larger biomolecules within the fractionation range of the column matrix





Sepapure® Desalting columns

Prepacked 1 ml or 5 ml columns

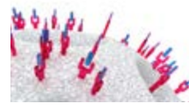
Key features

- Dextran based beads with particle sizes ranging from 20 – 50 µm
- 5 kDa exclusion limit (all molecules bigger than 5 kDa are not retained)
- Recommendend flow rates: 0.5 – 2 ml/min (1 ml column); 1 – 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Stored in 20% Ethanol

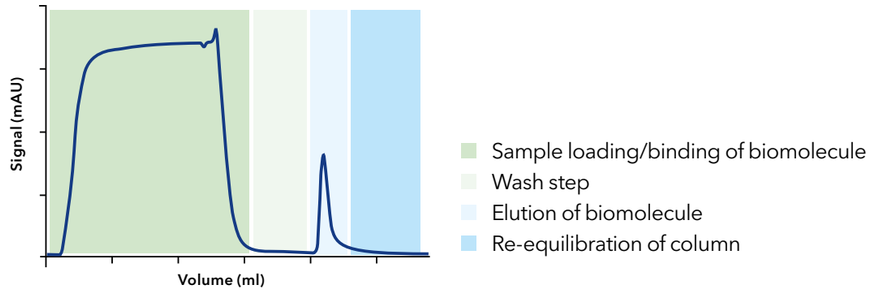
Affinity Chromatography (AC)

In affinity chromatography a higly specific interaction between the biomolecule of interest and the column matrix is resulting in the enrichment of the biomolecule at the stationary phase during the loading phase. Byproducts can be easily washed off in the wash phase. The elution of the target biomolecule is realized by washing the column with a buffer including a high amount of competing ligand or low pH.

Recombinant tagged proteins
His – Tag via Ni-NTA column
GST – Tag via Glutathione column



Antibodies and antibody fragments
via Protein A immobilized on column
via Protein G immobilized on column



Sepapure® Affinity columns

Prepacked 1 ml or 5 ml columns

Key features

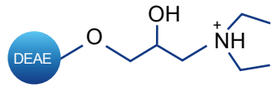
- Agarose based beads with particle size of 100 µm on average
- Static binding capacity: Ni-NTA < 40 mg/ml; Glutathione <10 mg/ml; Protein A < 30 mg/ml human IgG; Protein G < 15 mg/ml human IgG
- Recommendend flow rates: 0.5 – 2 ml/min (1 ml column); 1 – 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Stored in 20% Ethanol

Ion-Exchange Chromatography (IEX)

In ion-exchange chromatography biomolecules are separated according to their charge. Anion exchange is the method in which negatively charged molecules are binding to a positive matrix and in cation exchange positively charged biomolecules are binding to a negative column matrix. The bound molecules are released from the matrix by a gradual increase in ionic strength of the elution buffer.

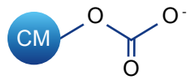
Anion Exchange
Strong Anion Exchanger (Q)

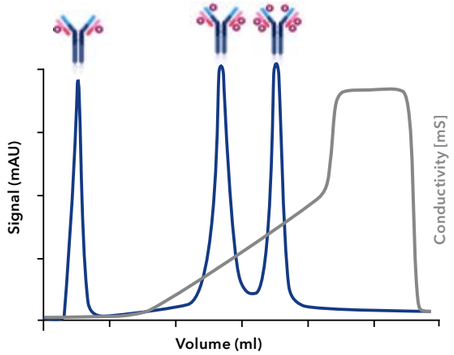
Weak Anion Exchanger (DEAE)



Cation Exchange
Strong Cation Exchanger (SP)

Weak Cation Exchanger (CM)

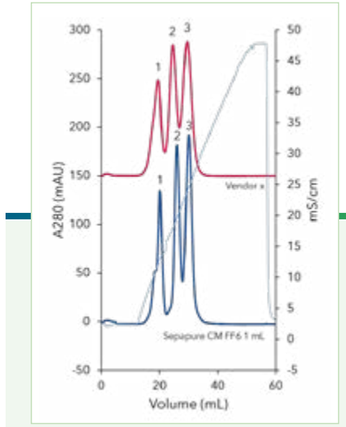




Sepapure® Ion-Exchange columns

Prepacked 1 ml or 5 ml columns

Key features
- Agarose based beads with particle size of 100 µm on average
- Ion capacity: < 0.12 mmol/ml
- Recommendend flow rates: 0.5 – 2 ml/min (1 ml column); 1 – 5 ml/min (5 ml column)
- Maximum pressure: 3 bar
- Delivered in 20% Ethanol



Comparison to other vendor
See information on detailed comparison of columns:
www.knauer.net/sepapure

Sepapure® bulk material

Next to prepacked FPLC columns KNAUER also offers FPLC bulk media for high performance purifications from lab to large-scale protein purification. In addition to the media used with the prepacked FPLC cartridges we also offer SEC resins for high resolution separations.

Resin Type / Volume	5 ml	10 ml	25 ml	50 ml	100 ml	150 ml	250 ml	500 ml	1000 ml
Glutathione	•		•		•		•	•	•
Ni-NTA			•		•		•	•	•
Protein A	•		•		•		•	•	•
Protein G		•	•						
IEX-Resins			•		•			•	•
SEC 75			•	•	•	•	•	•	•
SEC 200			•	•	•	•	•	•	•

Sepapure® Size Exclusion media

Key features
- Cross-linked agarose-dextran composite with a particle size of 35 µm on average
- Maximum pressure: 3 bar (SEC 75) or 4 bar (SEC 200)
- Separation range of Sepapure SEC 75: 3 – 70 kDa
- Separation range of Sepapure SEC 200: 6 – 600 kDa
- pH tolerance: 2 – 14 (short term) / 3 – 12 (long term)

Detection

We provide a choice of UV/VIS detectors, ranging from single variable wavelength to 8-channel diode array detector with 3D scan capability.

Detector	UVD 2.1S	MWD 2.1L	DAD 2.1L
	Compact and cost-effective variable single wavelength UV/VIS detector	Reliable multichannel UV/VIS detector	Diode array detector for peak purity check
Wavelength	190 – 500 nm	190 – 700 nm	190 – 700 nm
Channels	1	4	8
3D scan	n/a	n/a	+
Integrable in ASM	+		

More UV detectors available for your applications: www.knauer.net/detectors

AZURA® Conductivity Monitor CM 2.1S

- Conductivity monitor for checking salt gradient
- Flow rates up to 100 ml / min
- 0.01 mS/cm-999 mS/cm
- pH option available

Caution!
May cause higher back pressure

Flow cells for CM 2.1S				
Analytical	1/16"	10 ml / min	160 bar	30 µl volume
Preparative	1/16"	100 ml / min	100 bar	300 µl volume

AZURA® Detector RID 2.1L

Refractive Index Detector for cost-effective, fast and reliable analysis of non-UV absorbent compounds.

Universal detection

A wide range of third-party detectors can be seamlessly integrated into AZURA® systems.

Gradient compatible and universal detection

Light scattering detector

Using the unique Low Temperature technology, this Evaporative Light Scattering detector LC allows universal high sensitivity detection of non-UV active substances.

Fluorescence detector RF-20A

The fluorescence detector RF-20A provides world-class sensitivity, excellent maintainability and diverse validation / support functions. It supports a wide range of applications from conventional to high-performance analysis.

Sensitive and selective fluorophor detection

The KNAUER interface box IFU 2.1 LAN allows highly precise analog data acquisition of third party modules over analog and relay outputs. Example: MALS-detectors for molecular weight determination.

Flow cells

Select from an impressive range of easily exchangeable flow cells which cover a wide range of application. Optional fiber optics technology offers the possibility to separate the flow cell spatially from the device providing enhanced security for hazardous, explosive or toxic work processes.

Fraction collection

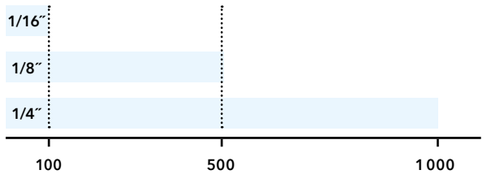
Collect large quantities or large numbers of fractions

Manually – collection by direct control
Volume-based – collection at defined volumes
Peak-based – collection according to detector signal

Fractionation valves

- Collecting large quantities
- From 6 to 16 fractions depending on the valve type
- Available as a single device or integrated into an Assistant ASM 2.1L for different flow rates

Fractionation valves max. flow rate (in ml/min)



Foxy Fraction collector

The Foxy R1 and Foxy R2 are versatile fraction collectors which fit to every purification need.

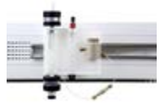
- Up to 125 ml/min for Foxy R1 and 1 000 ml/min for Foxy R2
- Wide choice of racks from 96-well microplates up to bottles or funnels
- Double capacity for Foxy R2 with automatic rack recognition
- Active cooling for Foxy R1
- Supported in software Puritychrom®
- Stand-alone operation
- Repeated collection in same vials

Vario 4000 & Vario 4000 plus

The Vario 4000 is a more advanced fraction collector for demanding applications with high flow rates and a high number of fractions. Individual rack types are programmable. Just assemble your rack to your needs.

- For flow rates up to 1 000 ml/min
- High number of fractions
- Supported in software Puritychrom®
- Standalone operation possible

Accessories

Accessory	Features	Benefit
Pressure Control 	• Contains two pressure sensors • Automatic determination of pressure difference with Purity-Chrom® • Connect 1/16" or 1/8" tubings • Up to 250 ml/min and 60 bar	Monitor pressure over the column bed and protect column from damage
Air Sensor 	• Detect end of buffer or end of sample with PurityChrom® • Up to four air sensors per system • For transparent tubings with 1/16" or 1/8" or 1/4" outer diameter	Protect column from air damage and support automation (e.g. sample injection)
AZURA® Click	• Attach air sensor, pressure control, AZURA Organizer or your interface box to the side panel of your AZURA L device	Organize your system.
AZURA® Organizer 	• Attach columns from 5 mm to 26 mm diameter, falcon tubes, a back pressure regulator or a pH flow cell	Organize accessories directly at the system and reduce dead volume
Back pressure regulator (BPR) 	• Apply a constant back pressure to your system • Freely adjustable between 1-20 bar or 20-103 bar	Prevent formation of air bubbles after the column which disturb detector signal
AZURA® Benchtop Rack 	• Install AZURA systems at space-limited sites, especially in cold rooms.	Space-saving solultion for AZURA system setup

AZURA® Bio purification systems

Product	Features	Page
AZURA Bio SEC 	0.001–10 ml/min, maximum 200 bar, injection valve sample for sample loops, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software	22
AZURA Bio AC 	0.01–50 ml/min, maximum 200 bar, selection valve for 6 buffers/samples, variable single wavelength UV-detector, fraction valve for 5 fractions and waste, PurityChrom® software	23
AZURA Bio Lab 	0.001–50 ml/min, maximum 200 bar, injection valve sample for sample loops, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software in basic configuration. Configure your FPLC system based on your purification requirement.	4
AZURA Bio Lab Two-step purification 	0.01–50 ml/min, maximum 200 bar, sample injection via sample loop or sample pump, automated storage and reinjection of proteins, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software	24
AZURA Bio Pilot 	Up to 1000 ml/min, sample pump for large sample volumes, variable single wavelength UV-detector, XY fraction collector, PurityChrom® software in basic configuration. Configure your FPLC system based on your purification requirements. Scale-up is possible with same flexibility, software but minimal footprint.	5

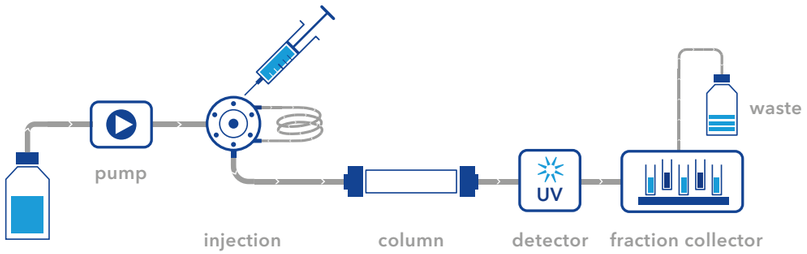
Components from lab to pilot

Product	Features	Page
Buffer delivery		
Compact pump	10 or 50 ml/min, isocratic	6
Gradient pump	10 or 50 ml/min, quaternary: selection of 4 buffers (A, B, C, D) Binary: selection of 2 buffers (A1, A2, B1, B2)	7
Scale-up pump	100, 250, 500, 1000 ml/min, binary to quaternary gradient	7
Extended buffer selection	With additional valves each for 8 buffers	6
Sample selection	For maximum 8 samples	10
Columns		
Column selection valves	For 2 columns, 5 columns and 5 columns with reverse flow option	11
Sepapure® columns and media	Columns and media for Affinity, Size Exclusion and Ion-Exchange Chromatography	12
Detection		
Wide choice of detectors	Variable single wavelength UV, multiple wavelength UV, full spectra diode array (DAD/3D Spectrum), conductivity and pH monitor, fluorescence, refrective Index	16
Fraction collection		
Fractionation valve	For 6 to 16 fractions, depending on the valve type with flowrates up to 1000 ml/min	18
Fraction collector	From 96-well microplates up to bottles or funnels, up to 1000 ml/min	18
Sample injection		
Injection valve	1/16" tubing: up to 50 ml/min 1/8" tubing: up to 500 ml/min	10
Sample pump	10 or 50 ml/min	10
Autosampler	Up to 10 ml injection volume, from microtiter plates to 10 ml vials	10
Software		
PurityChrom® software	Highly flexible method writing, intuitive user-interface, volume- or time-based, with special features like system visualisation, hold & adjust option, extended threshold functions, check for impurities	26
Safety features		
Accessories for protection and automation	Air sensor, pressure control, back-pressure regulator, leak management, mounting solutions	19

AZURA® Bio SEC system

Time consuming gel filtration runs?

AZURA Compact SEC systems take over time-consuming SEC methods in your lab without blocking your valuable FPLC system. Thanks to its compact design and intuitive FPLC software PurityChrom®, the system offers outstanding performance and ease of use. Pre-designed methods are included in the software and can be easily adapted by changing the column volume. AZURA Compact SEC supports all columns available on the market.



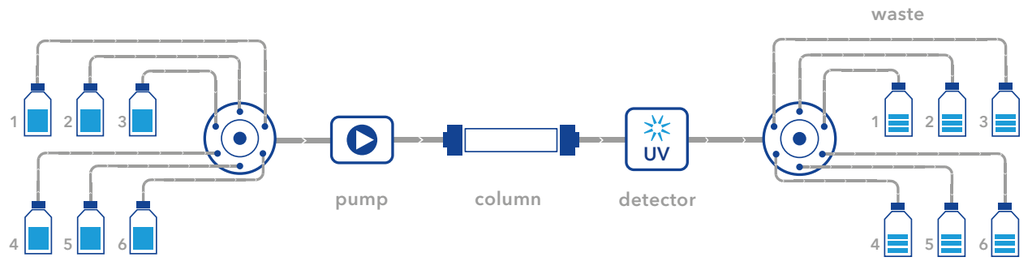
Key features

- Flow rate: 0.001–10 ml / min; 0.1–8.0 ml / min (recommended)
- Maximum system pressure: 150 bar
- Injection valve for sample injection via sample loop
- Variable single wavelength UV-detector (190–500 nm)
- Fraction collector for fractionation
- Columns from all venders can be used
- PurityChrom® software

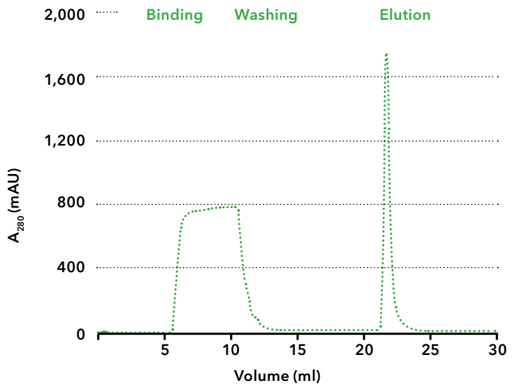
AZURA® Bio AC system

For affinity chromatography

The AZURA Compact AC system qualifies for fast and reliable affinity chromatography. Select your sample, your washing and elution buffer using the selection valve. Your proteins of interest are detected by UV and automatically collected via the fractionation valve.



Use the selection valve for your buffers and sample.



Protein purification based on high affinity Chromatogram & Legend

Key features

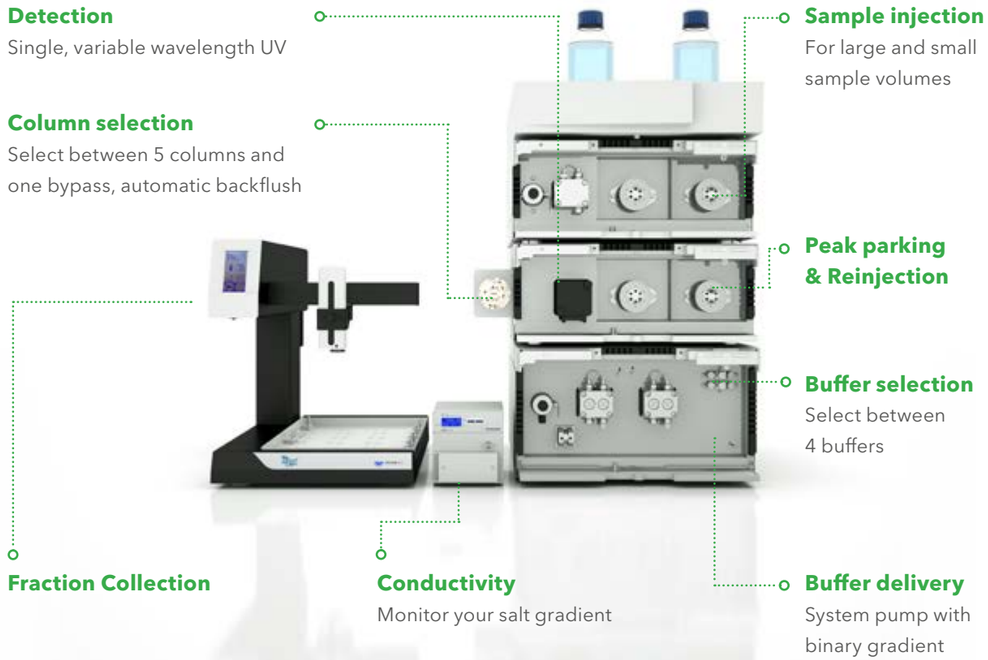
- Automatic sample/ buffer selection valve for up to 6 buffers or samples
- Fraction valve (6 ports) for fractionation
- Flow rate: 0.01 – 50 ml / min; 1 – 40 ml / min (recommended)
- Variable single wavelength UV-detector (190 – 500 nm)
- Columns from all venders can be used
- PurityChrom® software
- Maximum system pressure: 150 bar

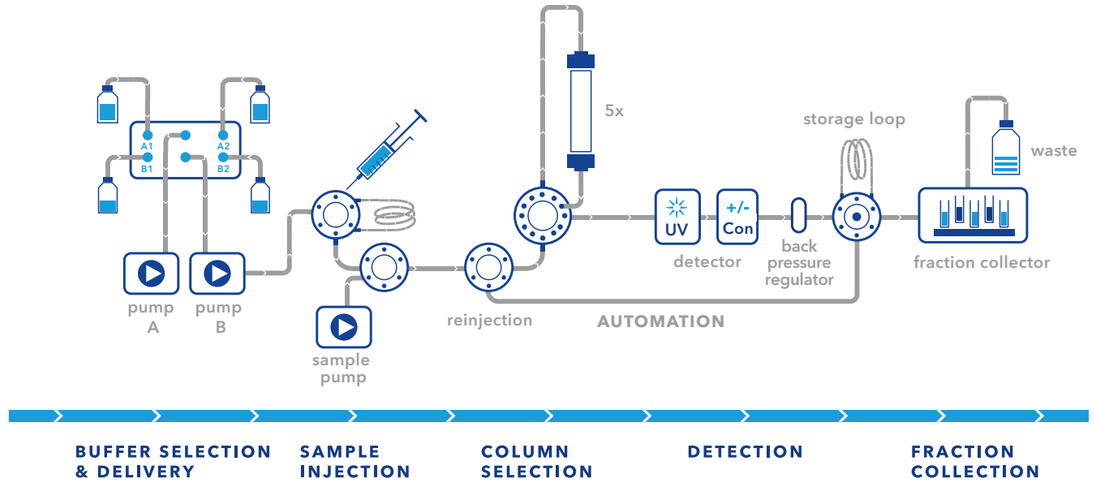
Special configuration
Two step purification

Special multicolumn chromatography solutions

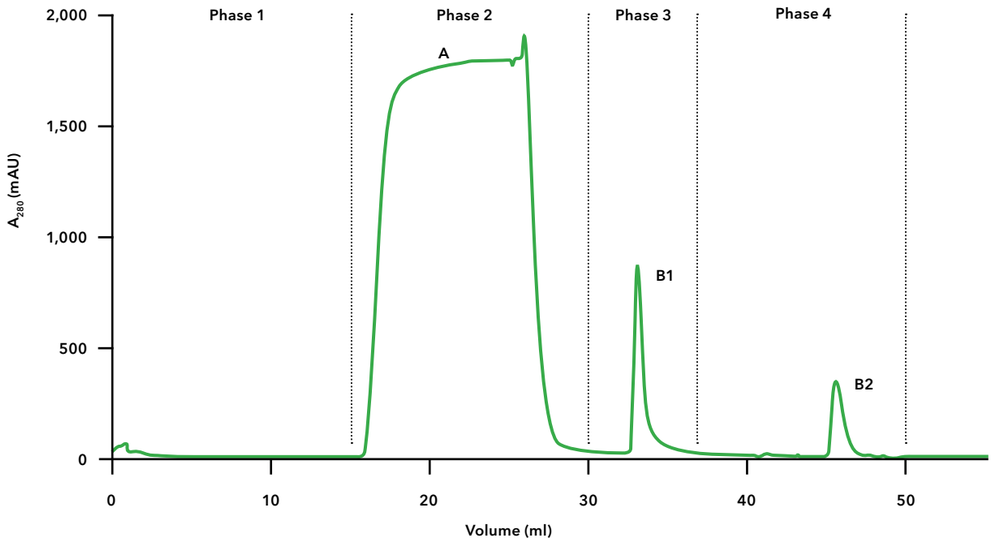
Protein purification involves most of the times two to three steps:
1. capture step
2. optional intermediated step
3. polishing step

The transition from one to another step generally involves manual interaction and thus is time consuming. Automation by combining these steps increases the efficiency and optimizes the workflow. The quick and automated linkage of multiple chromatographic purification steps into one method eliminates manual sample handling and minimizes time spent between steps. This automation strategy can be easily adapted to each purification task.





Automated two-step purification of mouse IgG antibodies

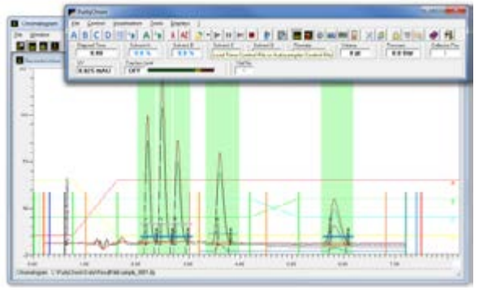


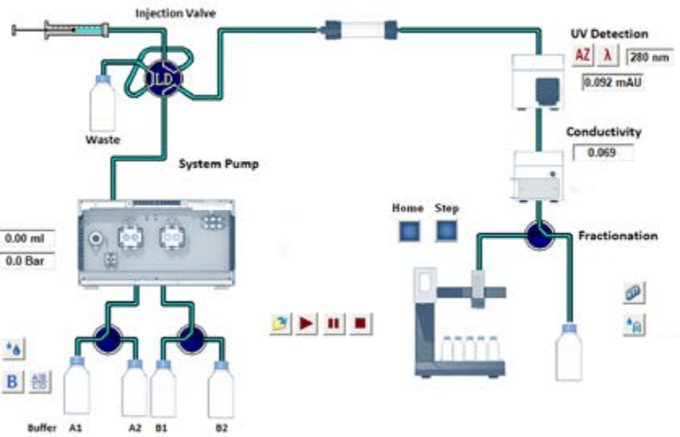
The affinity chromatography step was automatically combined with a gel filtration step to exchange the buffer of the purified mouse IgG antibodies; Phase 1: Column equilibration, Phase 2: Sample injection and washing, Phase 3: Elution of IgG from protein A column, Phase 4: Desalting of IgG

Control your purification

PurityChrom®

PurityChrom is a powerful software to control your FPLC system. Get familiar with PurityChrom in shortest time and with no effort due to the intuitive and clearly structured user interface. Choose a time-or volume based workflow by just clicking one button. Create methods with highest flexibility to realize complex application without losing easy handling. Offline licenses for creating methods and data evaluation are for free.





System visualization

Keep an eye on your system with the system visualisation. The interactive flow path allows to control your system. Switch valves, start pumps, set autozero, start fraction collection.

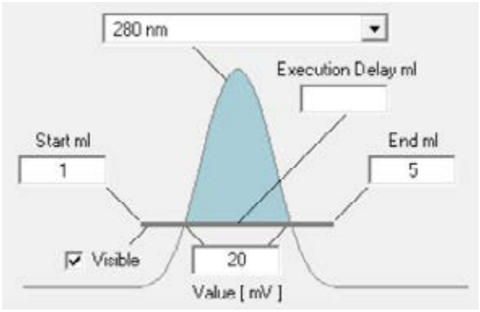
Hold & adjust (a running method)

You have full control of your run. Hold a run to adjust the method or the system. Stay always in control and change the parameters of a running method.

Extended threshold functions

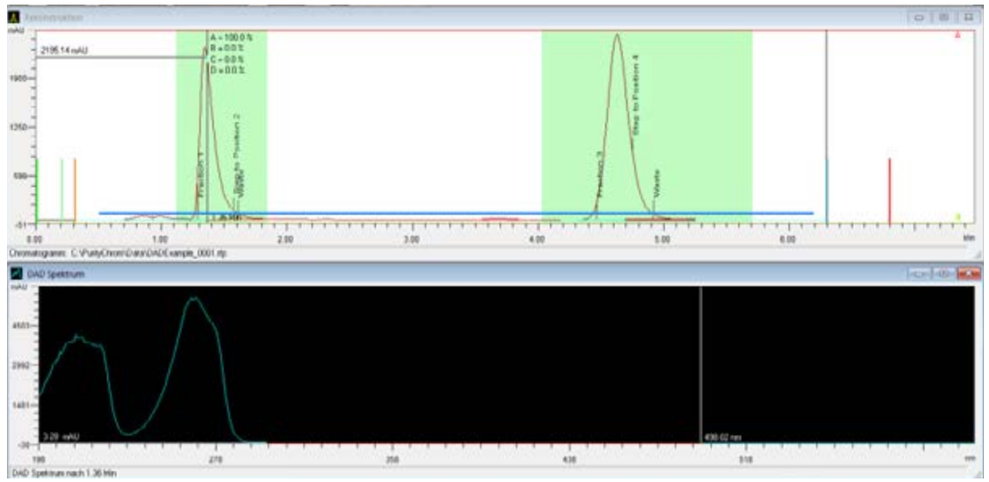
Automate any software function triggered by signals of any channel.

Automatically start fraction collection at the beginning of your desired peak. Protect the system from overpressure and air bubbles. After end of sample detection the software offers the possibility to automatically start or continue the run. Automate the whole purification starting from sample injection, via column washing to elution.



Check for impurities – full spectra diode array (DAD)

Check the purity of your peaks based on the absorbance spectra anywhere in the elution profile.

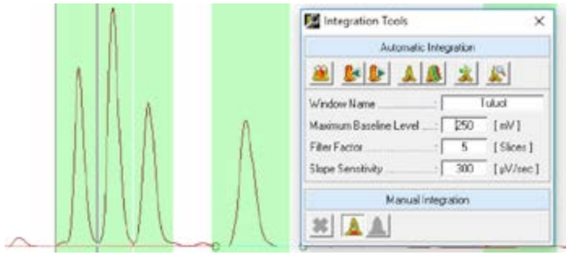


Tutorials on YouTube

Get familiarized with manually controlling your system, writing methods and analyzing your data using PurityChrom®.
www.youtube.de/KNAUERhplc

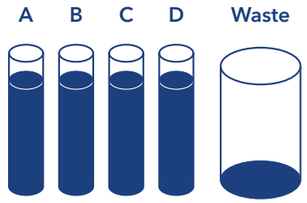
Intuitive data analysis

Integrate peaks fully automatically or manually. Receive the peak results by clicking on one button.



Solvent supply – calculate the consumption of buffers

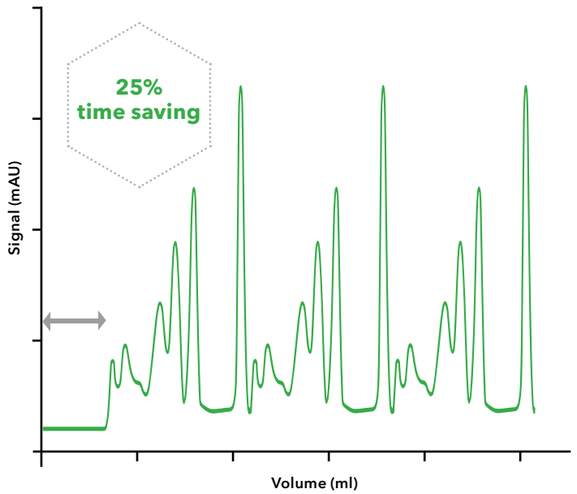
The solvent supply function calculates the consumption of buffers and the waste level for the current run, thus preventing the column from running dry and flooding the lab.



Stacked Injection

Size exclusion chromatography separates the proteins according to their size. After selection of SEC medium, sample volume and column dimensions are the two most critical parameters that will affect the resolution of the separation. For most SEC runs the sample volume should not exceed 2% of the total column volume to achieve maximum resolution.

For larger sample volumes the sample must therefore be divided into different runs. However, this takes a lot of time and is not very efficient. With the stacked injection function in PurityChrom it is possible to run different runs automatically one after the other. The injection of the next run takes place during the current run, so that the time until the elution of the first peak can be fully exploited. This increases efficiency and saves time.



Customer review

AZURA® Bio purification solution by KNAUER

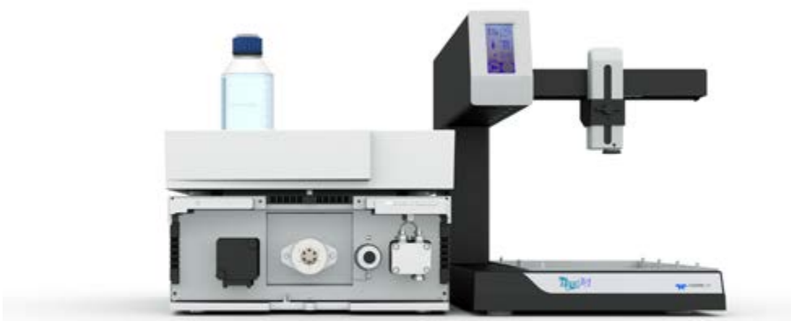
„Our KNAUER FPLCs are the workhorses in the lab."

"My lab studies the structure and function of membrane proteins. Due to the inherent instability of these proteins we purify them in the cold room. We needed robust FPLCs with good pumps that tolerated these conditions well.

In addition, the systems needed to be easy to maintain. Knauer provided us with skilled advice on virtually every component of the system, ranging from tubing and pumps up to the software. Consequently, our systems are perfectly tailored to our needs. Most of the maintenance we can do ourselves. For remaining questions, we can rely on the great support Knauer offers. Our Knauer FPLCs are the nononsense workhorses in the lab. I highly recommend Knauer."

Jun. Prof. Dr. Eric R. Geertsma
Institute of Biochemistry,
Goethe-University Frankfurt

Photo: Uwe Dettmar



System components

- AZURA® UV Detector UVD 2.1S
- AZURA® Valve Drive V 2.1S
- AZURA® Pump P 4.1S
- Foxy fraction collector

AZURA Compact SEC systems take over time-consuming SEC methods in your lab without blocking your valuable FPLC system.

Contact us:
sales@knauer.net

Science Together

Based in Berlin, KNAUER is a medium-sized, owner-managed company that has been serving the sciences since 1962. We develop and manufacture scientific instruments of superior quality for liquid chromatography. The range includes systems and components for analytical HPLC / UHPLC, preparative HPLC, fast protein liquid chromatography (FPLC), multi-column chromatography / simulated moving bed (SMB), and osmometry.

Worldwide partner in science since 1962

Independent and family owned

The founder Dr. Herbert Knauer and his wife Roswitha are still active as advisers in the company to this day. The couple's daughter, Alexandra Knauer, has been managing director and owner of the company since 2000. Several awards for outstanding products and innovations as well as entrepreneurial excellence make KNAUER a „leading employer".

We separate molecules and unite people.

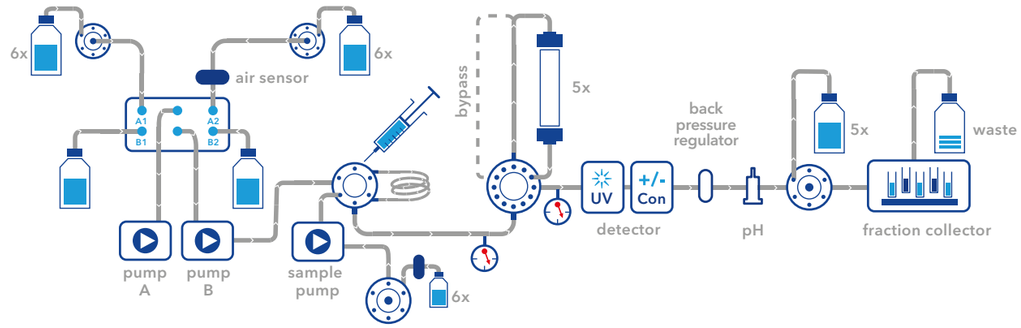
www.knauer.net

System configurator

Bio purification by KNAUER

METHOD

- ☐ **SEC** Size Exclusion Chromatography
- ☐ **AC** Affinity Chromatography
- ☐ **IEX** Ion-Exchange Chromatography
- ☐ **HIC** Hydrophobic Interaction Chromatography



BUFFER SELECTION & DELIVERY

- ☐ 10 ml/min binary gradient pump P 6.1L
- ☐ 10 ml/min quaternary pump P 6.1L
- ☐ 50 ml/min binary gradient pump P 6.1L
- ..... **x** 100 ml/min pump P 2.1L
- ..... **x** 250 ml/min pump P 2.1L
- ..... **x** 500 ml/min pump P 2.1L
- ..... **x** 1000 ml/min pump P 2.1L
- ☐ Ternary gradient module for pump P 2.1L
- ☐ Binary gradient module for pump P 2.1L
- ..... **x** Buffer selection valve (6 further inlets)
- ..... **x** Buffer selection valve (8 further inlets)

SAMPLE INJECTION

- ..... **x** Injection valve
- ☐ Sample pump module
- ☐ Sample selection valve: ..... **x** inlets
- ☐ Biocompatible Autosampler AS 6.1L

COLUMN SELECTION & THERMOSTAT

- ☐ Column selection valve up to 50 ml/min (5 columns, one bypass, reverse flow)
- ☐ Column selection (two columns or one bypass)
- ☐ Column selection high flow (5 columns, one bypass)
- ☐ Column selection high flow (5 columns, one bypass, reverse flow)

DETECTION

- ☐ UV/VIS single wavelength
- ☐ UV/VIS multiwave-length
- ☐ Conductivity
- ☐ pH
- ☐ Fluorescence
- ☐ Refractive index
- ☐ Light Scattering
- ☐ Analog integration of further detectors

FRACTION COLLECTION

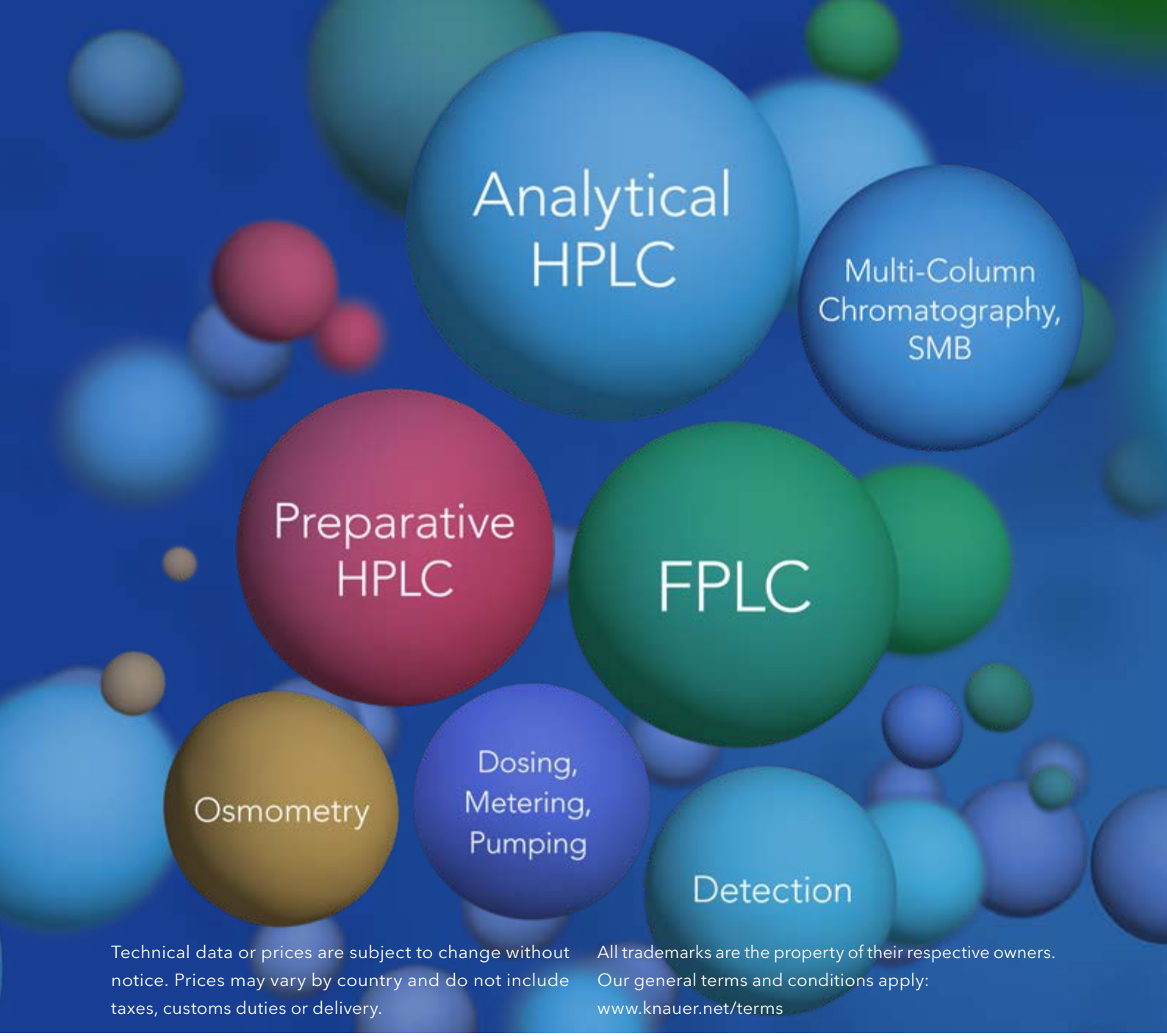
- ☐ Fractionation valve
- ☐ Foxy fraction collector with fixed rack types
- ☐ Labocol fraction collector with individual rack types
- ☐ Rack for fraction collector

COLUMNS & MEDIA

- ☐ **SEC**: Desalting ..... ml
- ☐ **SEC**: SEC 75 ..... ml
- ☐ **SEC**: SEC 200 ..... ml
- ☐ **AC**: Protein A ..... ml
- ☐ **AC**: Protein G ..... ml
- ☐ **AC**: Ni-NTA ..... ml
- ☐ **AC**: Glutathione ..... ml
- ☐ **IEX**: DEAE – Weak anion exchange ..... ml
- ☐ **IEX**: CM – Weak cation exchange ..... ml
- ☐ **IEX**: Q – Strong anion exchange ..... ml
- ☐ **IEX**: SP – Strong cation exchange ..... ml

ACCESSORIES

- ..... **x** Air sensor main pump
- ..... **x** Tubing 1/16"
- ..... **x** Air sensor feed pump
- ..... **x** Tubing 1/8"
- ☐ Pressure control (2 pressure sensors)
- ..... **x** Tubing 1/4"
- ..... **x** Back pressure regulator
- ☐ Workstation (Windows)
- ☐ AZURA Organizer



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