

## TECHNICAL SUPPORT SERVICES

We are committed to providing you with comprehensive and professional support, services and information.

We promise to provide lifetime service before, during and after the use period of the instrument.

## SHINE PROVIDES

- Sample testing and application consulting service;
- On-site installation and commissioning;
- Professional maintenance contract and maintenance service;
- Instrument operation training;
- Free software upgrade;
- Real-time technical support through video, telephone or e-mail;
- Localization services by cooperating with local distributors .

**OMNICHROM**  
OmniChrom Srl  
Via Brigate Partigiane, 20  
20037 - Paderno Dugnano (MI)  
P.IVA/C.F.: 09590050960  
[www.omnichrom.it](http://www.omnichrom.it) - [info@omnichrom.it](mailto:info@omnichrom.it)

## QINGDAO SHENGHAN CHROMATOGRAPH TECHNOLOGY CO., LTD.

Add: No.151 Zhuzhou Road, Laoshan District, Qingdao, China  
Tel: +86-532-68069317  
FAX: +86-532-68069838  
E-mail: [inquiry@qdsrd.com](mailto:inquiry@qdsrd.com)  
Web:<http://www.sheng-han.net/>

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## ION CHROMATOGRAPHY CONSUMABLES

Qingdao Shenghan Chromatograph Technology Co.,Ltd

# ION CHROMATOGRAPHY COMSUMABLES

Qingdao Shenghan Chromatograph Technology Co., Ltd (SHINE) is a technology service company providing ion chromatography technology. Focusing on customers, market-oriented, technology-driven, SHINE commits to providing customers with comprehensive technical services.

At present, SHINE has a comprehensive range of ion chromatography related products, including ion chromatographic column, general components, sample pretreatment equipment and other consumables. The ion chromatographic column has reached the international leading level. SH chromatographic column is one of the two major OH<sup>-</sup> system chromatographic columns in the world.

We provide one-stop service of ion chromatography to make your work simpler, the operation of ion chromatography system more reliable and the analysis results more accurate.

- 07-Anion chromatographic column
- 13-Cation chromatographic column



**PART 1**

## ION CHROMATOGRAPHIC COLUMN

- 17-Autosampler
- 18-Injection valve
- 19-Eluent generator
- 20-Infusion pump
- 21-Quaternary gradient pump
- 21-On-line degassing device
- 21-Post-column derivatization



**PART 3**

## FUNCTIONAL COMPONENTS

- 26-Universal consumables



**Part 5**

## UNIVERSAL CONSUMABLES

- 15-Conductivity detector
- 15-Electrochemical detector
- 15-UV/VIS detector
- 16-Suppressor



**PART 2**

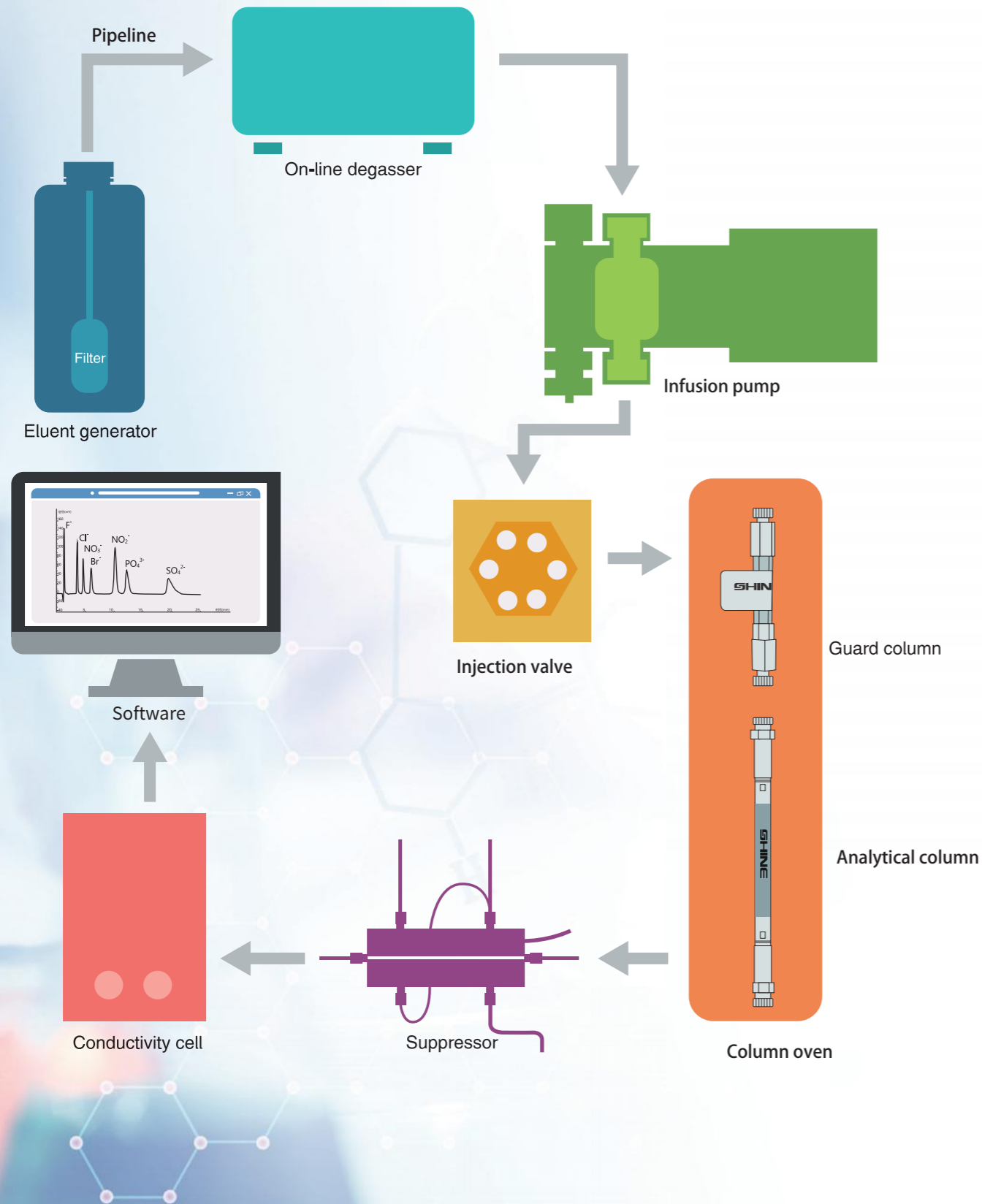
## DETECTION UNIT

- 22-SH series onguard cartridge
- 23-Needle filter
- 23-Oxygen bomb combustion sample processing device
- 24-Carbon dioxide removal device
- 24-Sand core filtration device
- 25-External column oven
- 25-Ultra-pure ion purifier



**PART 4**

## SAMPLE PRETREATMENT



IC COLUMN  
THE ONLY COMPANY IN CHINA THAT CAN BE ADOPTED IN  
MASS-PRODUCE OF ION CHROMATOGRAPHIC COLUMNS

## THE ONLY COMPANY IN CHINA THAT CAN BE ADOPTED IN MASS-PRODUCE OF ION CHROMATOGRAPHIC COLUMNS

Qingdao Shenghan Chromatograph Technology Co., Ltd.(SHINE) has been developing ion chromatographic column since 2008. As the only enterprise in China, it can realize mass production of IC column. Professional R&D team and advanced production technology ensure that you can get IC column with good reproducibility and separation effect at any time. At present, the excellent performance of SHINE SH series columns can provide different choices for users' daily detection and method development, and can reduce users' operation and maintenance costs by about 35%.

SHINE is the second company in the world that has successfully developed and mass-produced hydroxide system columns, breaking the monopoly of imported brands for more than ten years.

SH series columns using polymer-based spheres as matrix, our company's unique stationary phase bonding technology and polymer-based sphere surface treatment technology. The peak shape, separation, stability and reproducibility of SH series chromatographic columns are excellent.

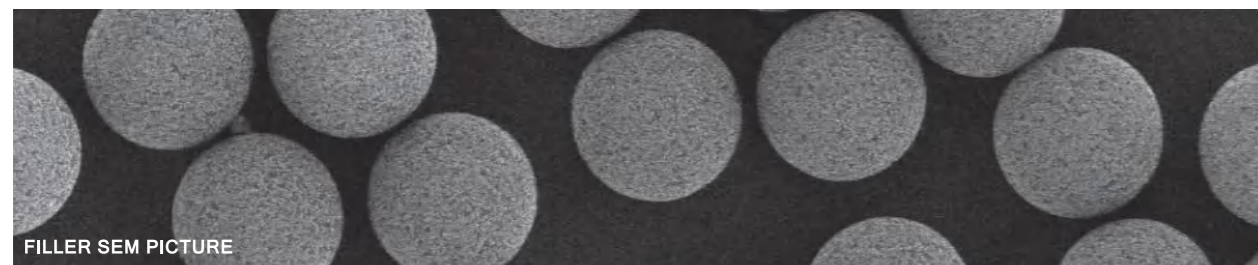
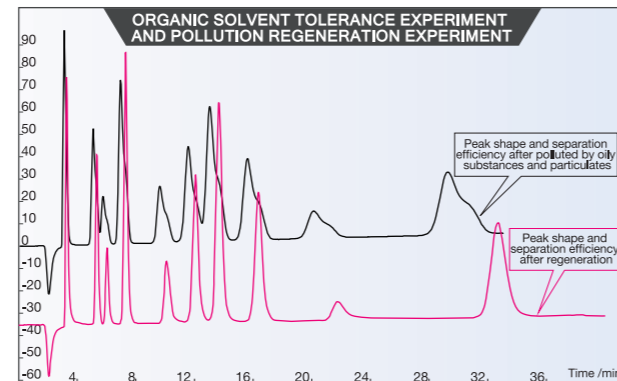
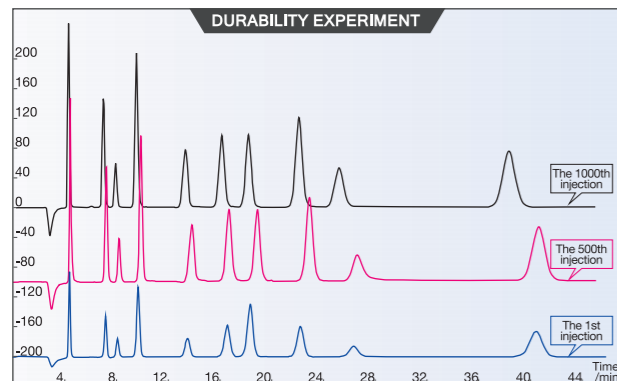
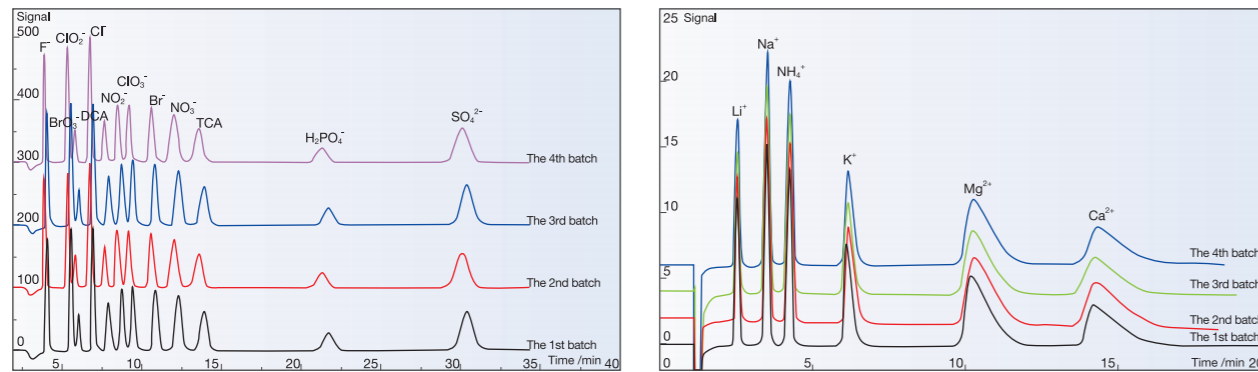


# SH SERIES ION CHROMATOGRAPHIC COLUMN

## THE MOST UNIVERSAL CHROMATOGRAPHIC COLUMN /

- > The first choice for developing or improving IC methods;
- > Excellent performance and stable polymer stationary phase;
- > Complete batch tracking and reproducibility;
- > The only mass-produced IC column in China;
- > It has wide applicability and can be widely applied to domestic and imported brand IC.

## EXCELLENT BATCH REPRODUCIBILITY /



FILLER SEM PICTURE



## COLUMN DETAILS PICTURE

### HARDWARE /

- > Very low diffusion hardware;
- > Innovative technic of sieve plate.

### FILLER /

- > High mechanical strength particles;
- > Advanced particle Sieving Technology;
- > Selectivity between batches remains stable;
- > Innovation of porous base ball manufacturing technology to provide super high exchange capacity;
- > Unique surface treatment technology for packing.



### PRODUCTION TECHNIC /

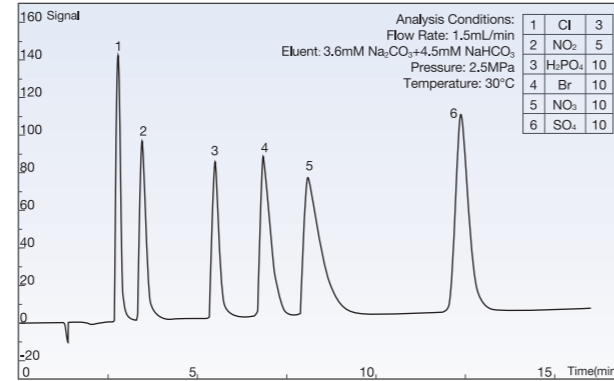
- > The mechanical stability and pressure resistance of the column bed are up to 300 bar;
- > Advanced packing technology and equipment for column.



# ANION CHROMATOGRAPHIC COLUMN

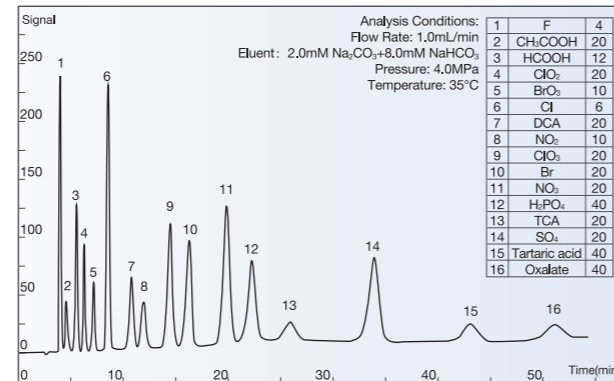
## SH-AC-1 COLUMN/ 4.6\*250MM/

- > A basic anion column, using carbonate system eluent, can simultaneously analyze 6 kinds of common anions:  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ ,  $\text{SO}_4^{2-}$ . With fast analysis speed and high cost performance, it is suitable for environmental protection, cement and other industries.



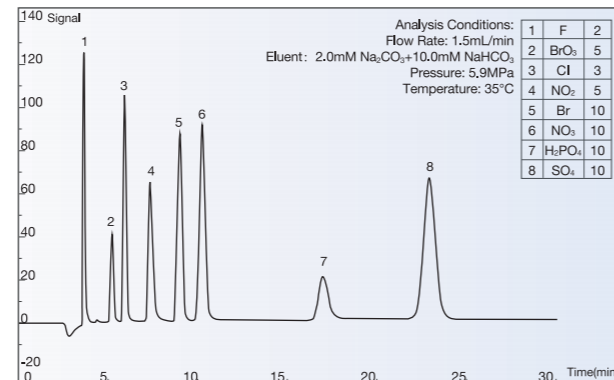
## SH-AC-3 COLUMN/ 4.0\*250MM/

- > An anion column with high efficiency, using carbonate system eluent. It can simultaneously analyze 7 kinds of common anions ( $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ ,  $\text{SO}_4^{2-}$ ), disinfection by-products ( $\text{BrO}_3^-$ ,  $\text{ClO}_2^-$ ,  $\text{ClO}_3^-$ , dichloroacetic acid DCA, trichloroacetic acid TCA) and other anions, especially for the analysis of halogenates containing oxygen and is suitable for various industries such as disease control, food, environment, metallurgy, geology and so on.



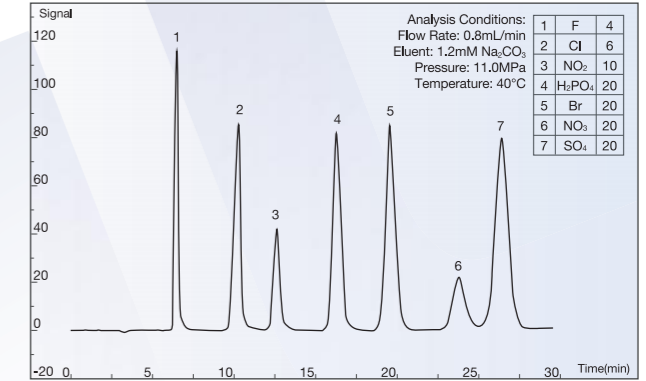
## SH-AC-4 COLUMN/ 4.6\*250MM/

- > A universal anion column, using carbonate system eluent, can simultaneously analyze  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ ,  $\text{SO}_3^{2-}$ ,  $\text{SO}_4^{2-}$ ,  $\text{BrO}_3^-$ . With low pressure and fast analysis speed, it is suitable for food, environment, metallurgy, geology and other industries.



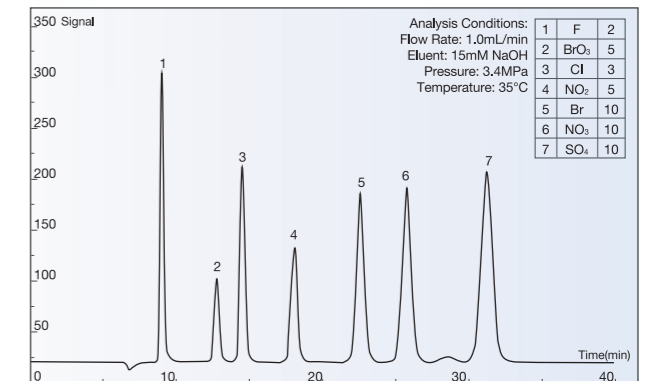
## SH-AC-9 COLUMN/ 4.6\*250MM/

- > A hydrophilic anion column, using carbonate system eluent, can simultaneously analyze 7 kinds common anions:  $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{H}_2\text{PO}_4^-$ ,  $\text{SO}_4^{2-}$ . With good separation of water negative peak and the  $\text{F}^-$  peak, it is suitable for electronic and electrical, petrochemical, environmental, metallurgical and other industries.



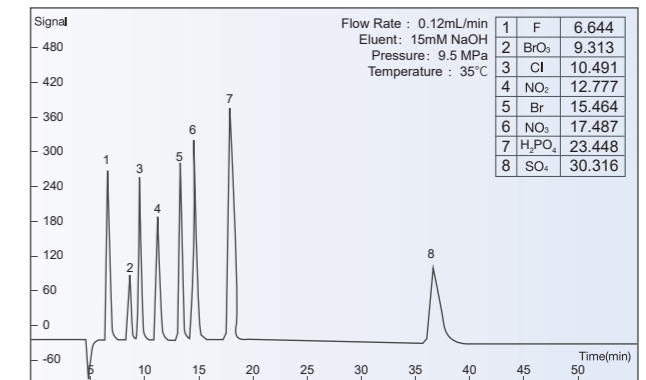
## SH-AC-11 COLUMN /4.6\*250MM /

- > An anion column with high efficiency, using hydroxide system eluent. It can simultaneously analyze 7 kinds of common anions ( $\text{F}^-$ ,  $\text{Cl}^-$ ,  $\text{Br}^-$ ,  $\text{NO}_2^-$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{SO}_4^{2-}$ ), disinfection by-products ( $\text{BrO}_3^-$ ,  $\text{ClO}_2^-$ ,  $\text{ClO}_3^-$ , dichloroacetic acid DCA, trichloroacetic acid TCA) and other anions. With good peak shape, gradient elution, higher sensitivity and wider application scope, it is suitable for drinking natural mineral water, packaging drinking water, drinking water and other industries.



## SH-AC-19 COLUMN /2.1\*200MM /

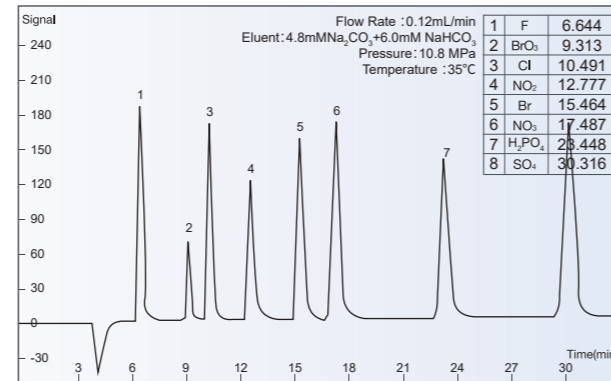
- > A microbore anion column, using hydroxide system eluent. With fine particle diameter, low flow rate and high signal response value, it can simultaneously analyze 8 kinds of anions:  $\text{F}^-$ ,  $\text{BrO}_3^-$ ,  $\text{Cl}^-$ ,  $\text{NO}_2^-$ ,  $\text{Br}^-$ ,  $\text{NO}_3^-$ ,  $\text{PO}_4^{3-}$ ,  $\text{SO}_4^{2-}$ .



# ANION CHROMATOGRAPHIC COLUMN

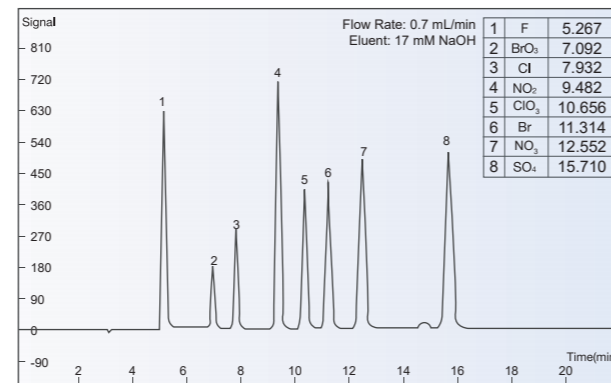
## SH-AC-20 COLUMN /2.1\*200MM /

> A microbore anion column, using carbonate system eluent With fine particle diameter, low flow rate and high signal response value, it can simultaneously analyze 8 kinds of anions :F<sup>-</sup>, BrO<sub>3</sub><sup>-</sup>, Cl<sup>-</sup>, NO<sub>2</sub><sup>-</sup>, Br<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>.



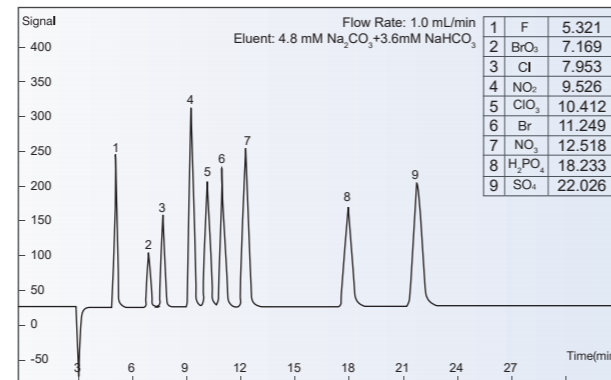
## SH-AP-1 COLUMN /4.0\*250MM /

> An anion columns with PEEK tube. Using hydroxide system eluent , it can be equipped with eluent generator to analysis 7 kinds of common anions (F<sup>-</sup>, Cl<sup>-</sup>, NO<sub>2</sub><sup>-</sup>, Br<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>.) and some disinfection by-products.



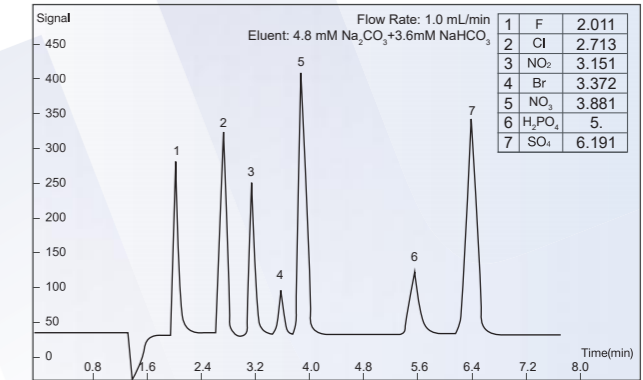
## SH-AP-2 COLUMN/4.0\*250MM /

> An anion columns with PEEK tube. Using carbonate system eluent , it can analysis 7 common anions: F<sup>-</sup>, Cl<sup>-</sup>, NO<sub>2</sub><sup>-</sup>, Br<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>, and some disinfection by-products.



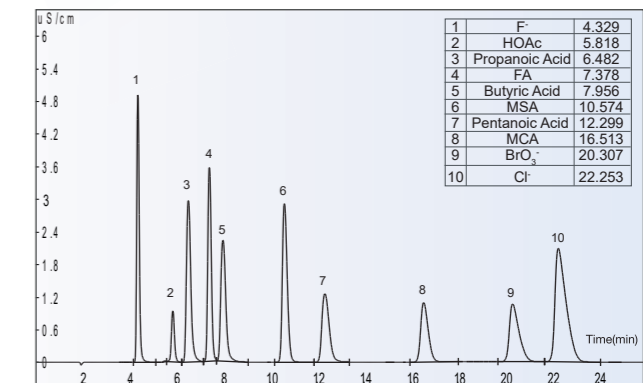
## SH-AP-3 COLUMN/4.0\*150MM /

> A rapid anion columns with PEEK tube. Using carbonate system eluent , it can analyze 7 common anions (F<sup>-</sup>, Cl<sup>-</sup>, NO<sub>2</sub><sup>-</sup>, Br<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, H<sub>2</sub>PO<sub>4</sub><sup>-</sup>, SO<sub>4</sub><sup>2-</sup>) rapidly.



## SH-AP-4 COLUMN/4.0\*250mm/

> A special column for separating weakly retained components. It uses hydroxide system eluent. With large column capacity and high resolution, it can be used for the analysis of F<sup>-</sup> and small molecular organic acids in complex matrices.



## SH-GP-2 COLUMN/4.0\*50MM /

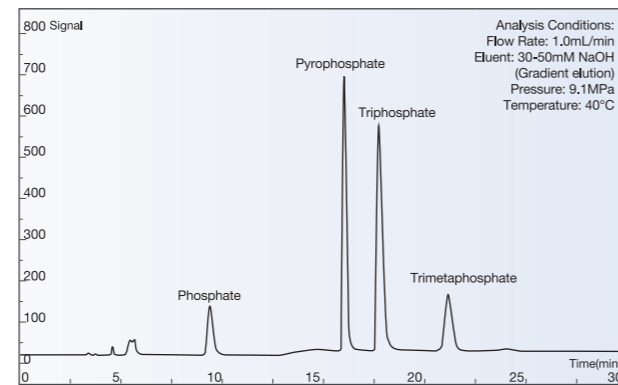
> A universal guard column with PEEK tube .It can filter the insoluble solid particles in mobile phase and sample, prevent column from being polluted and prolong the life of column.



# ANION CHROMATOGRAPHIC COLUMN

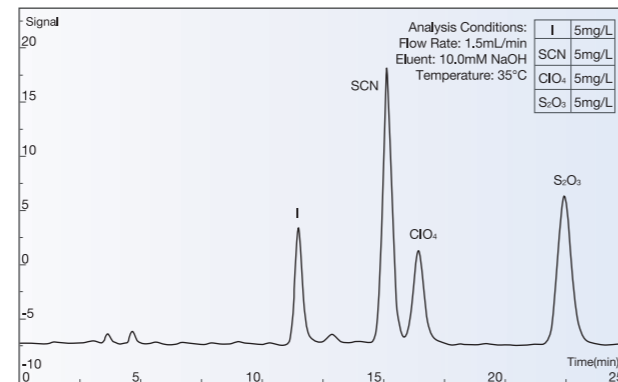
## SH-AC-16 COLUMN /4.6\*250MM /

- > A special anion column for polyphosphates, using hydroxide system eluent, mainly used to analyze polyphosphates in aquatic products.



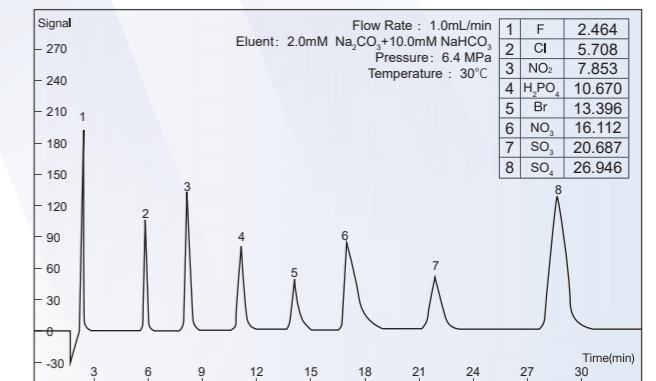
## SH-AC-17 COLUMN /4.6\*250MM /

- > A special anion column for I<sup>-</sup> with conductivity method, using hydroxide system eluent. It is mainly applicable to the analysis of I<sup>-</sup>, SCN<sup>-</sup> and S<sub>2</sub>O<sub>3</sub><sup>2-</sup> in the environment, solid waste and other industries.



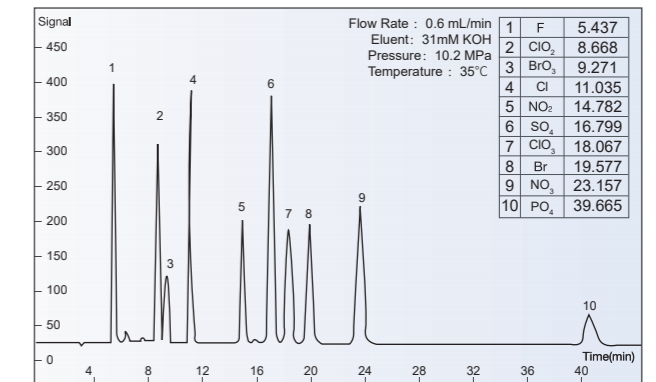
## SH-AC-18 COLUMN/4.6\*250MM /

- > A hydrophilic anion column with alkyl quaternary amine as the filler and carbonate as the eluent. Simultaneously analyzing 7 kinds of common anions: F<sup>-</sup>, Cl<sup>-</sup>, NO<sub>2</sub><sup>-</sup>, Br<sup>-</sup>, NO<sub>3</sub><sup>-</sup>, PO<sub>4</sub><sup>3-</sup> and SO<sub>3</sub><sup>2-</sup>. It especially good at separating SO<sub>3</sub><sup>2-</sup>.



## SH-AC-22 COLUMN/4.0\*250MM /

- > An anion column with large capacity and high resolution, using hydroxide system eluent. It is suitable for high resolution analysis of conventional anions and analysis of disinfection by-products. With the use of the eluent generator, the detection and analysis of fluoride in complex matrix such as fruit juice or tea, the analysis of some weakly retained small molecular organic acids in the complex matrix, and the analysis of nitrite in nitrite injection in the pharmacopoeia can be completed.

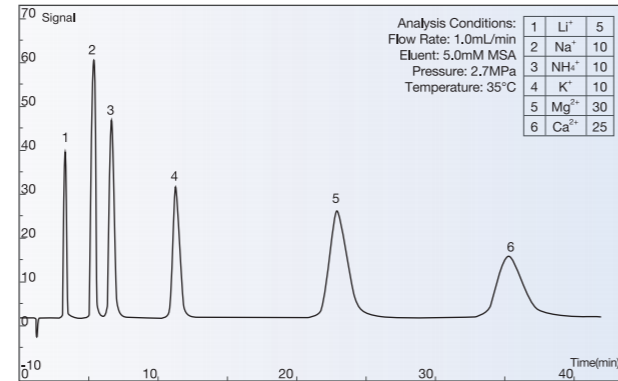




# CATION CHROMATOGRAPHIC COLUMN

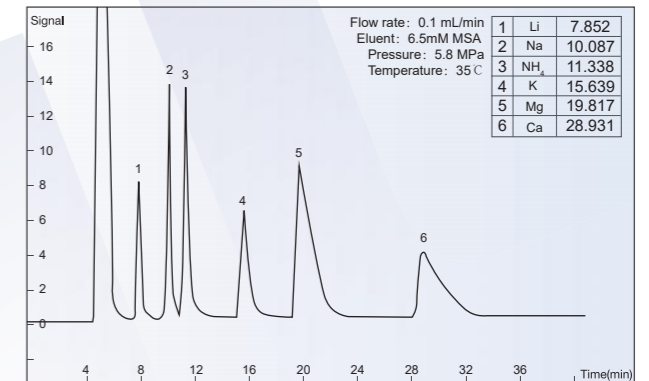
## SH-CC-3 COLUMN /4.6\*100MM /

- > A universal cation column, is mainly used to analyze 6 kinds of common cations (Li<sup>+</sup>, Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>). With well separability of Na<sup>+</sup> and NH<sub>4</sub><sup>+</sup> and low tailing factor of Mg<sup>2+</sup> and Ca<sup>2+</sup>, it is suitable for environmental, water quality, medical, food and other industries.



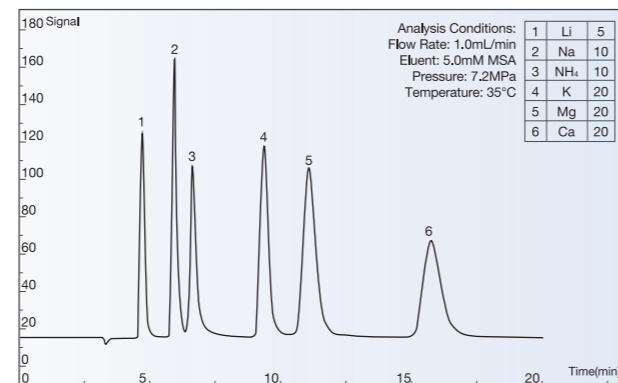
## SH-CC-7 COLUMN/2.1\*200MM /

- > A microbore weak acid cation column. With fine particle diameter, low flow rate and high signal response value, it can detect 6 kinds of conventional cations at low concentration and greatly reduce the consumption of eluent.



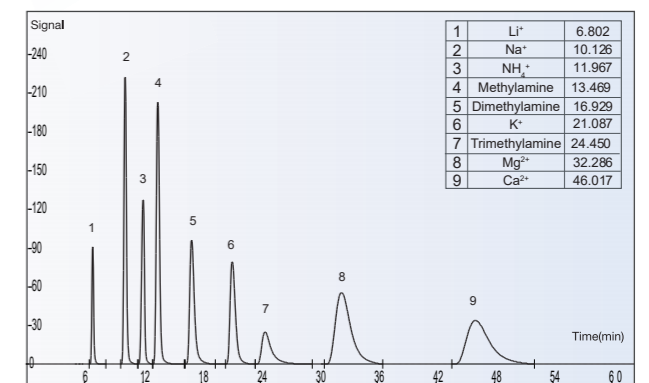
## SH-CC-4 COLUMN /4.0\*200MM /

- > A multifunctional cation column with MSA eluent. It can analyze 6 kinds of cations: Li<sup>+</sup>, Na<sup>+</sup>, NH<sub>4</sub><sup>+</sup>, K<sup>+</sup>, Mg<sup>2+</sup>, Ca<sup>2+</sup>. With low tailing factor of Mg<sup>2+</sup> and Ca<sup>2+</sup> and 100% acetone tolerance, it is suitable for cationic analysis in environmental, water quality, medical, food and other industries.



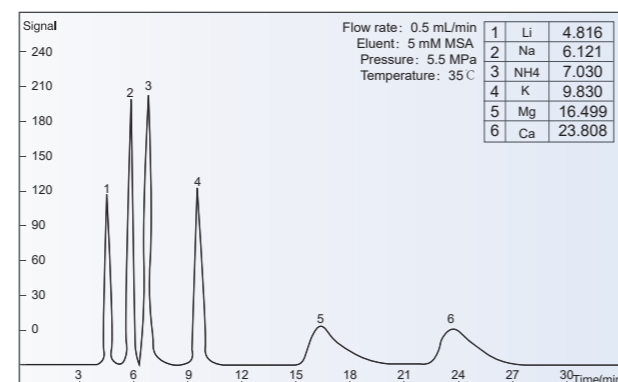
## SH-CC-9 COLUMN/4.6\*250MM/

- > A universal column, which is sensitive to the concentration change of eluent. It can complete the rapid analysis of 6 kinds of common cations and a variety of organic amines. It is also suitable for the analysis of sodium ammonium samples with high concentration difference ratio.



## SH-CC-6 COLUMN/3.0\*250MM /

- > A weak acid cation column with MSA eluent; it is used for the determination of monovalent alkali metals, ammonium salts, divalent alkaline earth metals and choline.



## SH-G-1 COLUMN /4.6\*50MM /

- > A universal guard column. It can filter the insoluble solid particles in mobile phase and sample, prevent column from being polluted and prolong the life of column.





## CONDUCTIVITY DETECTOR

- > The conductance detector continuously detects the conductivity of the eluate by loading voltage on the two electrodes in solution. The patented design of constant temperature conductivity detector can reduce the influence of temperature change, shield electromagnetic interference, increase signal response, and reduce baseline fluctuation and drift. The communication connection is carried out through COM port which is convenient for disassembly.

> Parameter

Model	Detection Range	Detection Resolution	Baseline Noise	Baseline Drift	Constant Temperature Range	Dead Volume
SHCD-1	0-15000 $\mu$ S/cm	0.0020ns/cm	$\leq$ 0.001 $\mu$ S/cm	$\leq$ 0.01 $\mu$ S/cm	Ambient Temperature +5 $^{\circ}$ C ~ 60 $^{\circ}$ C	$\leq$ 0.8 $\mu$ L



## ELECTROCHEMICAL DETECTOR

The electrochemical detector detects the change of current caused by the redox reaction of the substance to be measured on the electrode surface. It is often used to analyse ions with low dissociation, which are difficult to detect with conductivity detectors and have electrical activity.

- > With DC, PULSE and SCAN mode to meet the needs of different samples;
- > Full plastic flow path to reduce ion pollution;
- > High sensitivity, very low detection limit

> Parameter

Model	Type	Working Electrode	Signal Range	Noise	Potential Range	Reference Electrode	Cell Volume	Detectable Substance
SHE-8	DC mode	Silver electrode	-13 nA-+13 nA	$\leq$ 10pA	-10000mV - +10000mV with 1.0mV increments	Ag / AgCl (saturated KCl) electrode	<0.5 $\mu$ L	CN $^{-}$ , I $^{-}$ , Br $^{-}$ , S $^{2-}$



## UV/VIS DETECTOR

The UV/VIS detector adopts high-speed signal processing technology, has high sampling rate and excellent resolution, advanced optical path design, multi-color filter and grating, and the test wavelength is more stable, ensuring a better linear range. The wavelength is easy to disassemble, clean and maintain the flow cell, effectively extending the service life of the detector.

> Parameter

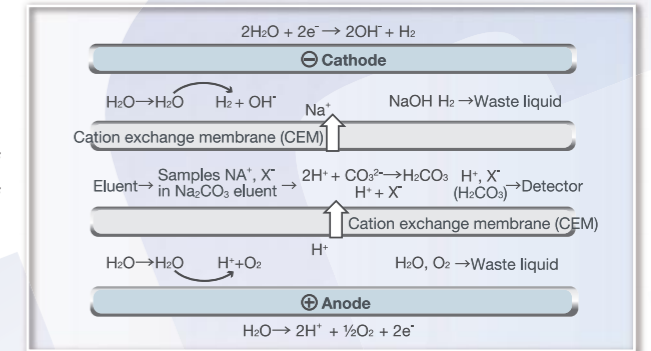
Model	Wavelength Range	Drift	Noise	Wavelength Repeatability	Wavelength Indicated Error
SHUV-10	190 nm -740 nm	1 $\times$ 10-4AU/HR	$\pm$ 0.5 $\times$ 10-5AU	0.2 nm	$\pm$ 1 nm



## SUPPRESSOR

### PRINCIPLE /

- > Suppressor produces H $^{+}$  and OH $^{-}$  through electrolysis of water at the electrode, and under the combined action of electric field and ion exchange membrane, it can realize the directional migration and exchange of ions. It reduces the background conductance, improves the sensitivity of ions to be measured, and makes the "counter ion" in the sample enter the waste liquid.



Principle diagram of anion suppressor

### SELF-REGENERATING ELECTROLYTIC MICRO-MEMBRANE SUPPRESSOR /

- > With advanced continuous regenerative membrane electric suppression technology, it doesn't need add acid or alkali to regenerate;
- > High suppression capacity, low background conductance, low noise, stable baseline and maintenance free;
- > Anti pollution, high pressure resistance and long life;
- > Compatible with 100% organic solvents;
- > It can match various types of ion chromatography products;
- > The signal line is connected by aeronautical connector, which is convenient for disassembly and assembly.

> Parameter

Model	Type	Current	Eluent	Pressure Resistance	PH Range	Dead Volume
SHY-A-7	Anion	0-300mA	CO $_3^{2-}$ /HCO $_3^{-}$ /OH $^{-}$	6MPa	0-14	< 40 $\mu$ L
SHY-C-5	Cation	0-300mA	MSA	6MPa	0-14	< 50 $\mu$ L



### MINIATURE SELF-REGENERATING ELECTROLYTIC MICRO-MEMBRANE SUPPRESSOR /

- > It is suitable for microbore and low flow column, with small dead volume;
- > With advanced continuous regenerative membrane electric suppression technology, it doesn't need add acid or alkali to regenerate;
- > Anti pollution, high pressure resistance and long life;
- > Compatible with 100% organic solvents;
- > It can match various types of ion chromatography products;
- > The signal line is connected by aeronautical connector, which is convenient for disassembly and assembly.

> Parameter

Model	Type	Current	Eluent	Pressure Resistance	PH Range	Dead Volume
SHY-A-6S	Anion	0-300mA	CO $_3^{2-}$ /HCO $_3^{-}$ /OH $^{-}$	4MPa	0-14	< 30 $\mu$ L
SHY-C-6S	Cation	0-300mA	MSA	4MPa	0-14	< 30 $\mu$ L



## AUTOSAMPLER

- > With the continuous development of ion chromatography, its application field is expanding, and the number of samples to be tested is also increasing rapidly. Ion chromatograph with autosampler can realize sampling automation without manual duty, greatly improve work efficiency, and greatly avoid the interference of human errors on the results.

### DISC AUTOMATIC SAMPLER /

- > Disc autosampler is very simple to operate. The sample tray uses open design to be directly observed. The large-capacity sample tube can be cleaned sufficiently, which improves the analysis accuracy.

> Parameter

Model	Sample Tray Style	Sample Number	Maximum Injection volume	Sampling Method	Injection Reproducibility
SHA-9	Disc	13mL×75	1000μL	Full quantitative loop	RSD<0.25%



### THREE DIMENSIONAL AUTOSAMPLER /

- > SHA-18 is a high-performance dual channel autosampler independently developed by Shine company, which has good control in micro liter injection accuracy.

> Parameter

Model	Vials	Injection Volume	Injection Accuracy	Sampling Method	Sample Residue
SHA-18	12mL*120	1uL-500uL	± 1%	Full loop / partial / micro injection	0.01%



### SINGLE/DUAL CHANNEL AUTOSAMPLER /

- > SHA-16 is a universal autosampler, which uses the most advanced sampling technology to achieve rapid sampling and rapid rinsing. It uses an efficient and multi-solvent needle-washing procedure to completely eliminate the residual sample, and the sample can be really cooled at 4 C.

> Parameter

Model	Sample Tray Style	Sample Number	Maximum Injection volume	Sampling Method	Inject on Reproducibility
SHA-16	Three dimensional	2mL×96	500μL	Full loop injection	Full loop injection(RSD <=0.3%)
				Partial loop injection	Partial loop injection(RSD <= 0.5%)
				μL pick up injection	μL pick up injection(RSD <= 1%)
				Carry-over	Carry-over: < 0.05%



## INJECTION VALVE

- > The injection valve is the most ideal sampler for IC and HPLC. It is composed of a circular sealing pad (rotor) and a fixed base (stator). It has the characteristics of simple structure, convenient to use, long service life and no maintenance in daily life.

### MANUAL SIX-WAY INJECTION VALVE /

- > SHMV-P6-1 manual six-way injection valve is a universal injection valve which is widely used in IC and LC. Cutting valve continuous flow design is adopted to avoid the impact of instantaneous pressure on the system. With excellent performance and long life, it can ensure continuous injection of 30,000 times.

> Parameter

Model	Valve Switching Mode	Maximum Pressure	Outer Diameter of Tube	Rotor Sealing Material	Contact Material of Medium
SHMV-P6-1	Manual	35MPa	φ1/16"	peek /ceramic /stainless steel	peek



### ELECTROMAGNETIC SIX-WAY INJECTION VALVE

- > SH series injection valve is an electromagnetic injection valve independently developed by SHINE. It uses a stepping motor to control the valve position switch. It has good sealing performance, compact structure, excellent performance, and can be realized automatically and manually. Strong acid and alkali organic solvents have good resistance, ensuring 100000 cycle life.

> Parameter

Model	Valve Switching Mode	Maximum Pressure	Outer Diameter of Tube	Valve Head material	Tolerance	Drive Power Supply
SHEV-P6-1	Stepping motor	30MPa	φ1/16	peek	PH 1-14	24V DC
SHEV-S6-1	Stepping motor	42MPa	φ1/16	Stainless steel	Organic solvents	24V DC

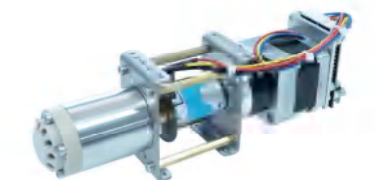


### ELECTROMAGNETIC TEN-WAY INJECTION VALVE

- > The SH series ten way valve is a dedicated switching valve with a more compact structure. And can switch at a high speed of 100ms (flow path switching angle: 36 degrees). The switching operation of the valve is level input, which is convenient for remote controlling.

> Parameter

Model	Valve Switching Mode	Maximum Pressure	Outer Diameter of Tube	Valve Head material	Tolerance	Drive Power Supply
SHEV-P10-1	Stepping motor	30MPa	φ1/16	peek	PH 1-14	24V DC



## ELUENT GENERATOR

- > The eluent generator is the core technology of the new generation reagent-free ion chromatograph. It realizes the function of generating the required concentration of eluent on-line only by adding pure water, eliminating the time-consuming operation of manual preparation of eluent, which greatly improves the automation of analysis and avoids the test error caused by human factors. At the same time, the intelligent control method can realize the self-defined setting of the concentration, the gradient elution and separation operation of complex samples that can not be completed by the isocratic pump, which further improves the accuracy of the analysis.



## ELUENT GENERATOR CARTRIDGE /

- > The eluent generator cartridge is the replacement consumable of the eluent generator. The eluent is replaced with the electrode to prevent leakage. It is connected by aeronautical connector and peek connector, which is convenient for disassembly and assembly.



## TRAP COLUMN /

- > The Trap column can continuously remove the ionic contaminants in the eluent, thus achieving low drift during gradient operation.



## INFUSION PUMP

### HIGH PRESSURE INFUSION PUMP (STAINLESS STEEL) /

- > High-pressure and low-pulse dual-piston tandem advection pump is made of stainless steel, which can achieve stable flow control without damper. The product adopts 32-bit embedded microprocessor with ARM7 core, electronic pressure fluctuation suppression technology, and high-precision DC servo motor, to realize the combinatorial analysis mode of isocratic, binary, quaternary gradient and micro-analysis, which is suitable for trace analysis in scientific research and special industries.



- > Parameter

Model	Material	Flow Range	Pressure Range	Flow Velocity Reproducibility	Transfusion Structure	Pipeline Specification	System Protection	Power Supply
SH-100A	Stainless steel	0.001-9.999 mL/min	0-42MPa	<0.2%	Dual-piston tandem	1/16"	Maximum pressure setting protection	24V DC

### HIGH PRESSURE INFUSION PUMP (PEEK) /

- > High-pressure and low-pulse dual-piston tandem advection pump is made of peek material, which can achieve stable flow control without damper. It can realize the combinatorial analysis mode of isocratic, binary, quaternary gradient and micro-analysis, and automatic piston rod cleaning and maintenance-free function, which is suitable for trace analysis in scientific research and special industries.



- > Parameter

Model	Material	Flow Range	Pressure Range	Flow Velocity Reproducibility	Transfusion Structure	Pipeline Specification	System Protection	Power Supply
SH-120A	peek	0.001-9.999 mL/min	0-36MPa	<0.1%	Dual-piston tandem	1/16"	Maximum pressure setting protection	24V DC



## QUATERNARY GRADIENT PUMP

The quaternary gradient pump uses technology to overcome the challenges of pumping IC/LC solvents at high pressure with low pulsation and is designed to fulfil the needs for low pressure mixing tasks. It contains one high-pressure pump and an integrated LPG mixing block with a 4 channel valve and the new developed mixer, a low-volume mixing device. The integrated degasser and inline filter are completing the analytical IC/HPLC pump and turn this pump into a working horse in the lab. For biocompatible applications or ion chromatography, this pump is also available with a complete metal-free design.



> Parameter

Mode	Pump head	Flow rate range	Maximum delivery pressure	Mixing volume	Flow rate increment	Pump head material
SHP-12	10mL	0.001-10mL/min	5800 psi/400bar /40 Mpa	200μL	0.001mL/min	Ceramic

## ON-LINE DEGASSING DEVICE

> The bubbles are formed by dissolving or mixing air in the mobile phase solution, and noise peaks appear on the chromatogram when the bubbles enter the detector. When the bubbles enter the flow path or column, the flow velocity of the mobile phase becomes slower and unstable, resulting in fluctuation of the baseline. In the on-line degassing device, there is a transfusion tube made of porous synthetic resin film, which has a vacuum container outside. When the mobile phase passes through the transfusion tube, oxygen, nitrogen, carbon dioxide and so on will be removed from the inside of the membrane into the outside.



> Parameter

Model degassing	Vacuum Pressure	Maximum Flow	Internal Volume	Pressure Resistance of Degassing Channel
SHT-5	<-85kPa	10mL/min	570μL	70PSIG

## POST-COLUMN DERIVATIZATION

> Connected with HPLC and equipped with derivative reagent, it can detect glyphosate, aminomethylphosphonic acid, paraquat, amino acids, biological polyamines, streptomycin, carbamate insecticides, amino sugar antibiotics, aflatoxin, polyether antibiotics, formaldehyde, cholesterol and other samples.



> Parameter

Model	Maximum Pressure	Flow Range	Flow stability	Temperature Control Range	Protection Temperature	Volume
SH-PCD-1	36 MPa	0.001 mL /min-9.999 mL /min	≤ 1%	Room temperature + 5-100 °C	100 °C	0.1-3mL

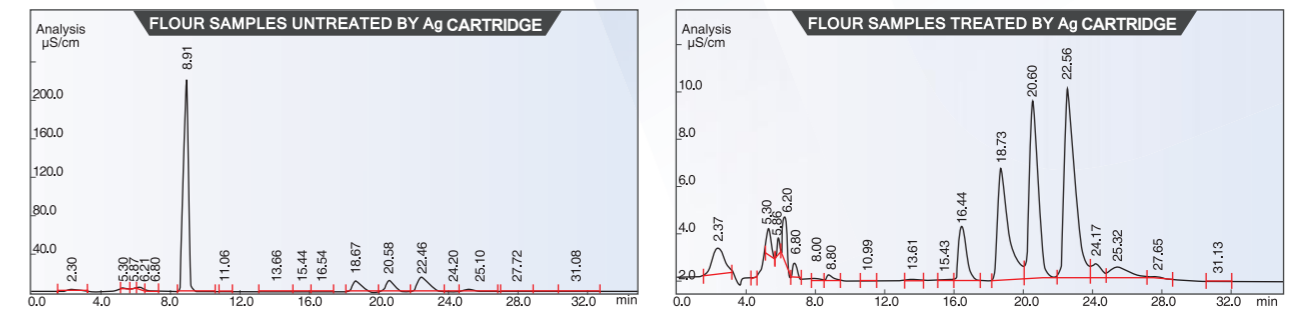
## SH SERIES ONGUARD CARTRIDGE

### WHY SHOULD SAMPLES BE PRETREATED?

> In the process of analysis, the impurity interference, organic matter or metal ions in the sample will pollute the packings of column, reduce the separation ability and service life of the column, and the impurity ions will interfere with the separation of ions. So the OnGuard Cartridge should be used. It can effectively remove the organic matter and impurity ions in the sample, avoid the contamination of impurities on the column and the influence on the separation effect, effectively prolong the service life of the column and improve the separation effect of the sample.



### COMPARISON OF FLOUR SAMPLES BEFORE AND AFTER TREATED BY SH-Ag COLUMN:



### ORDERING INFORMATION

Name	Specifications	Impurity Removal Mechanism	Application
SH IC-C18	1cc/2.5cc	Inverse adsorption mechanism	Remove hydrophobic compounds, which is not applicable to sample with too high or too low pH values
SH IC-RP	1cc/2.5cc	Inverse adsorption mechanism	Remove hydrophobic compounds, especially unsaturated compounds and aromatic compounds, which is applicable to sample with pH values ranging from 0 to 14.0
SH IC-P	1cc/2.5cc	Inverse adsorption mechanism	It has same function as RP and good selectivity for polar substances.
SH IC-H	1cc/2.5cc	Ion exchange	Remove alkali earth metal ions, transitional metal ions, and carbonate ions, and neutralize the strongly alkalinity of sample
SH IC-Na	1cc/2.5cc	Ion exchange	Remove alkali earth metal ions and transitional metal ions in sample
SH IC-Ag	1cc/2.5cc	Ion exchange	Remove Cl <sup>-</sup> , Br <sup>-</sup> , I <sup>-</sup> , AsO <sub>4</sub> <sup>3-</sup> , CrO <sub>4</sub> <sup>2-</sup> , CN <sup>-</sup> , MoO <sub>4</sub> <sup>2-</sup> , PO <sub>4</sub> <sup>3-</sup> , SeO <sub>3</sub> <sup>2-</sup> , SO <sub>3</sub> <sup>2-</sup> , SeCN <sup>-</sup> , S <sub>2</sub> <sup>2-</sup> , SCN <sup>-</sup> , WO <sub>4</sub> <sup>2-</sup> etc.
SH IC-Ba	1cc/2.5cc	Ion exchange	Remove SO <sub>4</sub> <sup>2-</sup> . If the anion concentration of the sample is low, it needs to be activated with Cl <sup>-</sup> solution, and the pH value is stable at 1-14.
SH IC-HCO <sub>3</sub>	1cc/2.5cc	Ion exchange	Remove anionic pollutants and neutralize strong acidity of sample
SH IC-Ag/H	2.5cc	Ion exchange	Function equivalent to series use of Ag and H columns
SH IC-Ag/Na	2.5cc	Ion exchange	Function equivalent to series use of Ag and Na columns
SH IC-Ba/H	2.5cc	Ion exchange	Function equivalent to series use of Ba and H columns
SH IC-M	1cc/2.5cc	Chelating mechanism	Remove alkali earth metal ions, alkali and transitional metal ions



## NEEDLE FILTER

- > Disposable needle filter is a fast, convenient and reliable filter commonly used in the laboratory. With beautiful appearance, light weight and high cleanliness ,it mainly used for sample pre-filtration and particulate matter removal. It is the first choice for filtering small samples of IC, HPLC and GC.Each batch of needle filters are tested by ion chromatography. Testing the 1 mL pure water passed through the filter , the results showed that the ion dissolution level reached the level of ion chromatography analysis.



> Parameter

Sample	Filter Material	Aperture	Effective Filtration Area	Processing Capacity	Shell
Water	PES	0.22μm/0.45μm	1.0cm <sup>2</sup>	<10ml	Polypropylene
Organic	Nylon	0.22μm/0.45μm	1.0cm <sup>2</sup>	<10ml	Polypropylene

## OXYGEN BOMB COMBUSTION SAMPLE PROCESSING DEVICE

Oxygen bomb combustion sample processing device is a pretreatment device for the analysis of non-metallic elements in organic samples. The samples are burned in a airtight pure oxygen system. The components to be measured are released from the sample and absorbed by the absorbent liquid placed in the oxygen bottle. Then the absorbent liquid can be analyzed by IC. It is widely used in quantitative analysis of harmful halogen elements in electrical plastics products and circuit boards.

- > Quantitative decomposition of halogen, S and volatile metals such as Hg, As and Cd;
- > It can absorb flammable samples in liquid medium;
- > Pressure vesse made of high grade special stainless steel.

> Parameter

Model	Withstand Pressure	Oxygen Bomb Airtight	Weight	Ignition Power Supply
YCY-4	20MPa	3.5MPa	2kg	0-3V AC safety voltage



## CARBON DIOXIDE REMOVAL DEVICE

- > The carbon dioxide removal device is installed between the suppressor and conductivity detector. Carbonates from the sample in the hydroxide system can interfere with the analysis of anions, such as sulfates. Under these conditions, using a carbon dioxide removal device to minimize carbonates can improve the integration and quantification of target anion peaks .



> Parameter

Model	Flow Range	Dead Volume	Pressure	Carbonate Removal Rate
SH-CRD-1	0.01-200mL/min	≤ 200uL	≤ 1MPa	>80%

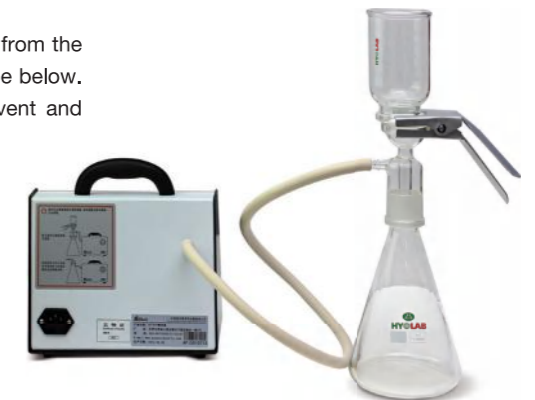
## SAND CORE FILTRATION DEVICE

Under the action of the vacuum pump, the sample is treated by flowing from the above glass through the sand core filter membrane into the conical bottle below. This is the ideal choice for vacuum filtration and degassing of IC solvent and mobile phase.

- > The sand core filter is made of 100% borosilicate glass, which can resist the corrosive solvent;
- > It can filter out solid particles and bacteria in the sample;
- > The no-oil degassing pump can reduce pollution of oil gas to samples;
- > It is used in chemical analysis, hygienic inspection, environmental monitoring, biological products, pharmaceutical industry, scientific research and so on.

> Parameter

Material	Filter Cup Volume	Conical Bottle Capacity	Membrane	Vacuum Pressure
Borosilicate glass	250mL	1L	0.22μm/0.45μm	≥80kPa



## EXTERNAL COLUMN OVEN

> Column oven is an essential part to HPLC/IC. To achieve the desired analysis effect, correctly manages column's temperature, improves the column's efficiency, sensitivity, improves distances among chromatogram peaks, saves time, lowers reverse pressure- all are essential elements to a high quality operation.



## ULTRA-PURE ION PURIFIER

> In the exchange layer of ultra-pure ion purifier, the dielectric ions in the water undergo directional movement under the action of a DC electric field, and the water is purified by the selective permeation of exchange membrane. Not only can the unqualified UP water prepared by reverse osmosis (RO water) and water purification machine (the ion content exceeds the standard) be further purified to meet the requirements of ion chromatography, but also the UP Water prepared by the water purification machine can be further purified to meet the detection requirements of ultra-trace ions in the semiconductor, nuclear power, and thermal power fields.

> Parameter

Model	Electric Current	Current	Inflow Resistivity
SHDI-10	Max 2mL/min	0-20mA	> 15MΩ*cm
SHUG-20	0.5-1L/min	0.5-1.5A	> 15MΩ*cm



Filter membrane



High pressure eluent bottle



Centrifuge



Sample vial



SPE cartridges



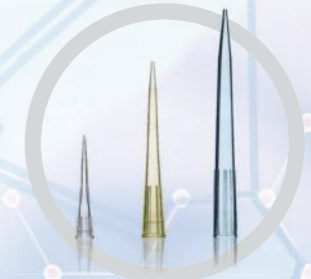
QuEChERS kits



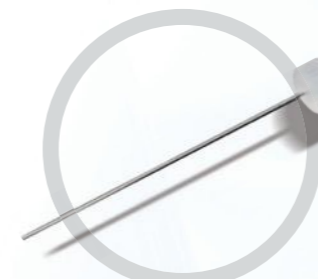
Centrifuge tube



Sample storage bottle



Pipette tip



Injection needle



Pipette



Solid phase micro-extraction