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TOSOH

Tosoh Ion Chromatography Catalog

ION CHROMATOGRAPH
IC-8100

● ION CHROMATOGRAPH IC-8100

● ION CHROMATOGRAPHY COLUMNS

High-Speed Ion Chromatography

IC-8100

CONTENTS

High-Speed Ion Chromatography

IC-8100 Series

“5-minutes analysis” for one sample could be achieved by high speed & high resolution column and various system configurations that enable easier and higher-throughput Ion Chromatography analysis.

IC-8100 series is a high-performace & high-speed Ion Chromatography system which integrates with TSKgel® high speed & high resolution column technology that can realize high throughput analysis.
The measurement time is within 5 minutes for both common Anions and Cations.
Tosoh's original gel replacing type suppressor enables stable analysis at low cost.
With the auto eluent generator unit, you are free from the anxiety of daily eluent preparation and preparation errors.

Product Line up

Ion Chromatograph

IC-8100EX

An automatic analysis system equipped with an autosampler.
Compact design with integrated degasser, liquid feed pump, autosampler, suppressor unit, column oven and electrical conductivity detector.
The autosampler has automatic dilution function up to 100 times as standard equipment.

IC-8100ST

Basic system with manual injector
Like the IC-8100 EX, it has all the mechanisms required for suppressor analysis.

WorkStation

IC-8100-WS

IC-8100 series standard accessories
Dedicated software with system control, data analysis, and data management functions.
We provide various analysis methods suitable for daily routine analysis.
Strong support for a pleasant analytical environment

Optional Unit

UV-8100

UV Detector

ES-8100

Automatic eluent generator unit

High-Speed Ion Chromatography

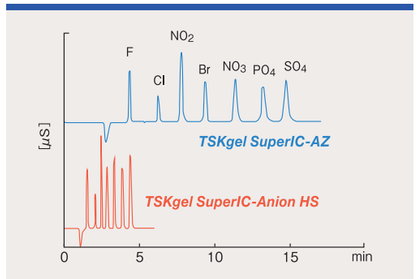
Features of IC-8100 Series

High-throughput analysis within 5 minutes

In combination with a high-speed separation column, measurement of anions and cations can be completed within 5 minutes.
The analysis time can be greatly shortened.

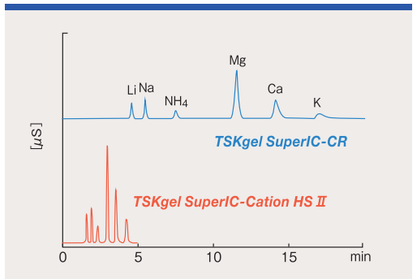
- The measurement time of anions can be shortened from 16 minutes to 5 minutes (compared to our conventional product).
- The measurement time of cations can be shortened from 20 minutes to 5 minutes (compared to our conventional product).

Example of Standard Anions Measurement



Flow rate : (upper) 0.8 mL/min (lower) 1.5 mL/min
Pressure : (upper) 8.5 MPa (lower) 16.0 MPa

Example of Standard Cations Measurement



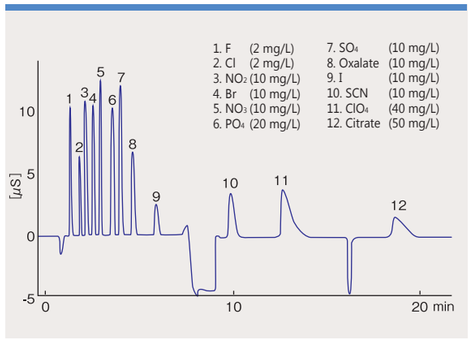
Flow rate : (upper) 0.7 mL/min (lower) 1.2 mL/min
Pressure : (upper) 9.0 MPa (lower) 17.8 MPa

Eluent and Flow Gradient function

Eluent step gradient and flow step gradient are possible.
It is convenient for simultaneous measurement of wide range retention capacity ions.
And the cleaning of column can be efficiently performed

- Analysis time is greatly shortened by eluent step gradient.
- Column cleaning can be efficiently performed by flow step gradient.
- The degasser has two flow line.

Analysis under eluent gradient condition

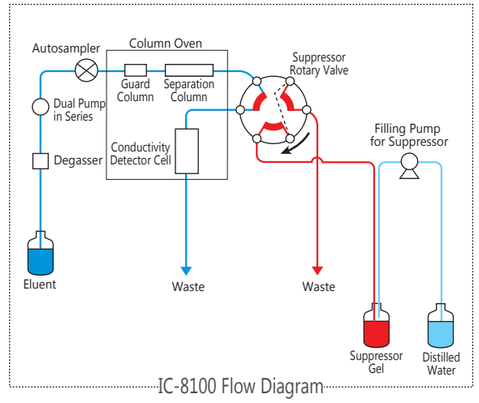


Column	: TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm) TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent A	: 3.8 mmol/L $NaHCO_3$+3.0 mmol/L Na_2CO_3
Eluent B	: 4.5 mmol/L $NaHCO_3$+3.5 mmol/L Na_2CO_3 + 10 % Acetonitrile
A to B	: Step gradient (6.0 min)
Flow rate	: 1.5 mL/min (0-6.5 min), 1.3 mL/min (6.5-20 min)
Temperature	: 40 °C
Suppressor changeover	: 8.5 min, 16.5 min
Suppressor gel	: TSKgel suppress IC-A
Detection	: Conductivity
Injection volume	: 30 μL

Automatic gel replacing suppressor system

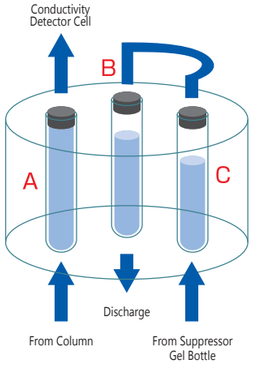
Stable and continuous high sensitivity analysis can be achieved by gel suppressor system which consists of suppressor gel and rotary valve.

- Suppressor gel is automatically replaced according to the injection timing of autosampler.
  - Regeneration of suppressor is not needed.
  - Contaminants from sample do not accumulate in suppressor.
  - There is no decrease in sensitivity due to deterioration of the suppressor.
- Low dead volume reduces sample diffusion.
- Suppressor gel low sensor is equipped.
- Two types of suppressor gel bottles are available. (30 mL or 60 mL)



IC-8100 Flow Diagram

Flow of Suppressor Gel Replacement

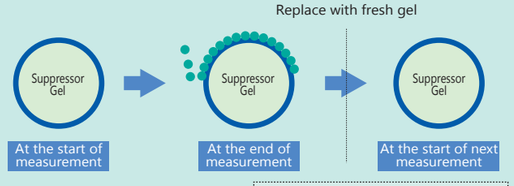


Port Status During Analysis

Port A → In Analysis
Port B → Discharging
Port C → Charging

Suppressor Gel Bottle (60 mL)

Features of Gel Suppressor System



The gel suppressor system automatically conducts the exchange of suppressor gel according to the injection timing of autosampler. Since the suppressor gel is changed after each measurement, it is not affected by sample contaminants that adsorbed on the suppressor gel. Therefore, it is possible to perform analysis at a stable baseline every time.

Ion Chromatography System

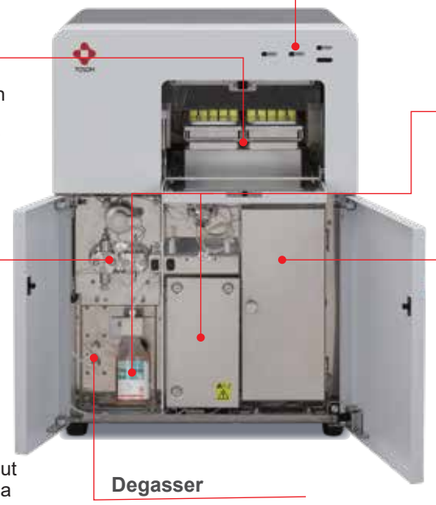
IC-8100EX

Product Number: 0024500

Integrated IC system with built-in autosampler

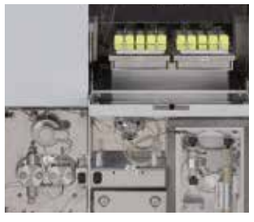
An integrated ion chromatography system that can measure anions and cations with high sensitivity.
Compact design that integrates degasser, analytical pump, autosampler, suppressor unit, column oven, and electrical conductivity detector.
All units can be accessed from the front of the device, making it easy to maintain.
The autosampler is equipped with an automatic dilution mechanism, resulting in significant savings in time and cost for sample handling.
Various systems configuration can be constructed by combining various options.

IC-8100EX



Autosampler

A 100 samples set is possible.
The workstation can be set to run continuous measure up to 200 samples, which is very useful for multi-sample processing.



Pump

Low pulsation and high-throughput analysisi is possible by adopting a micro-capacity plunger type dual pump with high pressure limit of 35 MPa.

Status Display LED

Indicates the power status, error display, and sample rack removal status.

Suppressor Gel Suppressor Rotary Valve

Suppressor gel is changed in each measurement, a stable suppression effect can be achieved.

Column Oven

High sensitivity and stable baseline measurement can be achieved by block temperature controller integrated with the conductivity cell.

Degasser

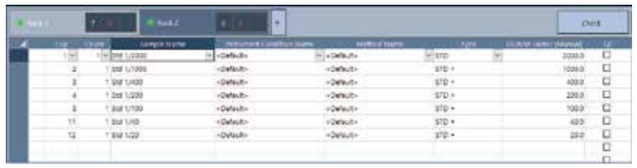
Degassed eluent enables stable eluent feeding without air trouble.

Continuous 100-200 samples measurement

Two racks for 50 samples are equipped as standard.
Continuous measurement can be set in the workstation.
Combined with high-throughput analysis, a large number of samples can be processed efficiently in a short time.

- 100 samples set is possible.
- Two racks for 50 samples are equipped. Sample are efficiently set.
- Samples can be replaced or added during analysis.

50 samples / rack X 2 racks = 100 samples



Each rack can be managed on the workstation setting screen

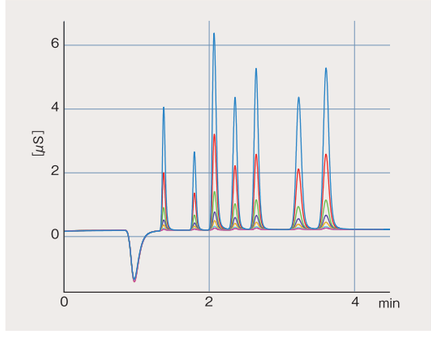
Up to 4 racks (200 samples) can be set

Autosampler with automatic dilution function

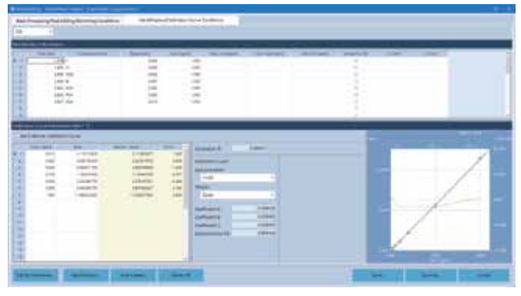
The autosampler is equipped with automatic dilution function as standard.
Automatic dilution analysis is easily set up in workstation.

- Six types of dilution ratio: 2, 5, 10, 20, 50, 100 times can be choosed.
- Dilution ratio can be set for each sample.
- Dilution reproducibility within 1 % (area n = 6) can be achieved.
- A calibration curve can be created by applying the dilution function on the standard solution.

Overlaid chromatogram of the dilution of standard anion



Calibration curve created by automatic dilution function



Ion Chromatography System

IC-8100ST

Product Number: 0024501

Integrated IC system with built-in manual injector

An integrated ion chromatograph system that allows manual injection.
Compact design that integrates degasser, analytical pump, manual injector, suppressor unit, column oven, and electrical conductivity detector.
High sensitivity measurement using a suppressor can be achieved at a reasonable cost.

IC-8100ST

System Configuration

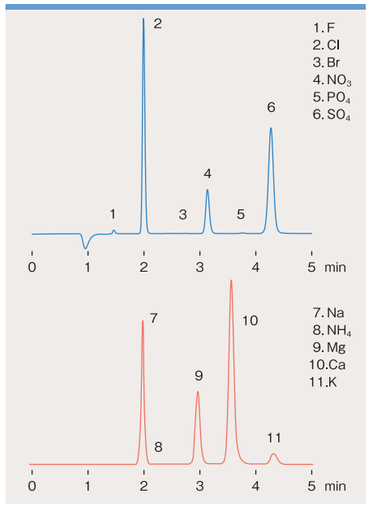
Anion and Cation analysis system
(Dual system injection mode)

Dual system injection mode can be configured by connecting IC-8100EX and IC-8100ST.
It allows IC-8100EX autosampler to perform injection into both IC-8100EX and IC-8100ST channels simultaneously, therefore anion and cation analysis can be performed parallelly.
Even if dual system injection mode is configured, it also can perform as a single IC system analysis like a stand-alone system.

IC-8100EX IC-8100ST

System control in dual system injection mode

Analysis of anions and cations in river water



Column : Anion TSKgel SuperIC-Anion HS
Cation TSKgel SuperIC-Cation HSII

ION CHROMATOGRAPH IC-8100

Auto Eluent Generator

ES-8100

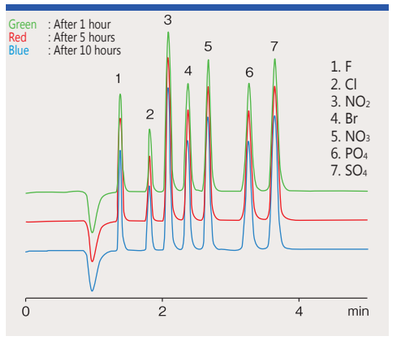
Product Number: 0024505

Auto eluent generator dedicated for IC-8100EX

The newly developed eluent generator unit stably prepares the eluent and supplies it to the device.
Analysis can be done simply by setting concentrated eluent and pure water.
Since freshly generated eluent with the constant composition is always supplied, stable analysis can be achieved without fluctuations of retention time through the measurement.

ES-8100

Example of analysis using ES-8100



Reproducibility of SO_4 peak retention time (RT) and peak area

n=60	RT	P. Area
Average	3.639	28.40
CV(%)	0.09	0.17

It is possible to supply eluent with constant composition at all time

Column : TSKgel SuperIC-Anion HS
Conc. Eluent : TSKgel eluent Conc. IC-A-HS-5
Flow Rate : 1.5 mL/min

Changes in retention time (RT) in a long time analysis

RT of SO_4 Peak	min
After 1 hour	3.643
After 5 hours	3.639
After 10 hours	3.635

Retention time does not change even it is used for a long time, thus stable analysis is possible.

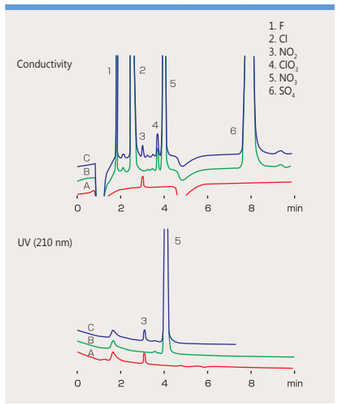
Column : TSKgel SuperIC-Anion HS
Conc. Eluent : TSKgel eluent Conc. IC-A-HS-5
Flow Rate : 1.5 mL/min

System Configuration

Auto eluent generator for anion analysis system

ES-8100 IC-8100EX UV-8100

Analysis of nitrite-nitrogen in tap water



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 7.5 mmol/L $NaHCO_3$+0.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection: Conductivity, UV (210 nm)
Flow rate : 1.5 mL/min Temperature: 40 °C
Injection vol. : 100 µL
A : Standard nitrite ion (0.004 mg/L as NO_2-N)
B : Tap water (no nitrite ion added)
C : Tap water (nitrite ion spiked, 0.004 mg/L as NO_2-N)

*Ethylenediamine solution (50 mg/mL) is added in each samples (1 ml/L).

UV / Vis Detector

UV-8100

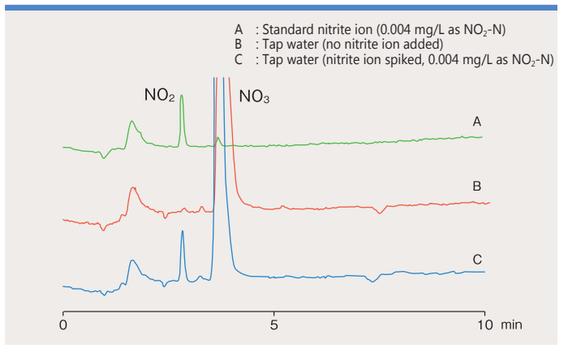
Product Number: 0024503

UV / Vis detector dedicated for IC-8100 series

It is possible to detect in a broad UV / Vis wavelength range with deuterium and halogen lamps.
Low noise and low drift baseline is achieved by the design of optimized flow cell and flow path that minimizes temperature changes.
Sensitivity is improved about 5 times compared to our conventional device (calculated from the S/N ratio of nitrite ion).

UV-8100

Analysis of low concentration nitrite-nitrogen



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 7.5 mmol/L $NaHCO_3$+0.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Wavelength : 210 nm
Flow rate : 1.5 mL/min
Temperature : 40 °C
Injection vol. : 30 µL

*Ethylenediamine solution (50 mg/mL) is added in each samples (1 ml/L).

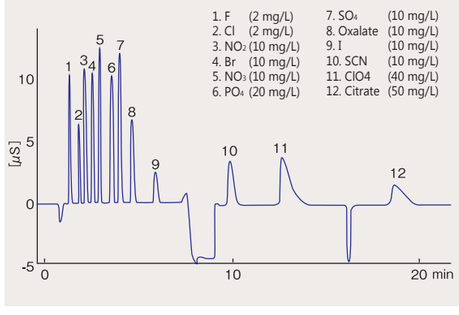
IC-8100 Series Accessories

Eluent Switching Valve

Product Number: 0024508

Eluent switching valve unit allows IC-8100 series system to perform step gradient elution.
When a component with strong retention, which is difficult to elute with isocratic elution, can be eluted by switching to an eluent with strong elution property.
In addition, if there is concern about column contamination, switching to a cleaning eluent can improve column durability.

Analysis under eluent gradient condition



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent A : 3.8 mmol/L $NaHCO_3$+3.0 mmol/L Na_2CO_3
Eluent B : 4.5 mmol/L $NaHCO_3$+3.5 mmol/L Na_2CO_3+ 10 % Acetonitrile
A to B : Step gradient (6.0 min)
Flow rate : 1.5 mL/min (0-6.5 min), 1.3 mL/min (6.5-20 min)

IC-8100 Series Accessories

External I / O Terminal Kit

The detector and injection signal (or error signal) from the IC-8100 series can be output to an external device. At the same time, it could capture the detector signal and injection signal (or error signal) from an external device. It is also used when connecting to a combustion pretreatment device or an integrator.

P/N	Product Name
0024564	EXT Board (AFF)
0017546	Analog signal cable 2m
0022001	Ferrite core

When using, please purchase the above 3 products.

System Configuration

Combustion Ion Chromatography System

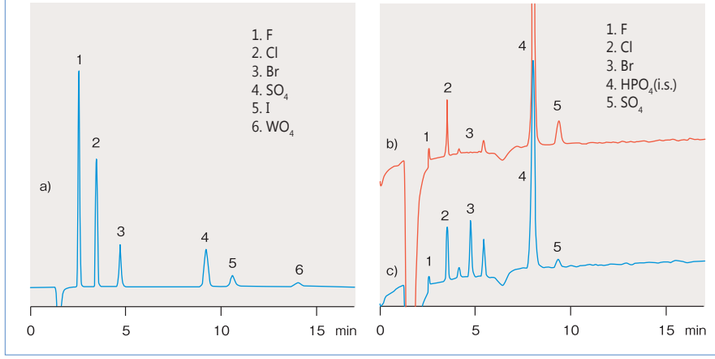
When IC-8100 series system is connected online with a sample combustion pretreatment device, it can be used as a combustion ion chromatography system.
When combined with a high-throughput column, iodide peak elutes within 12 minutes and tungstate peak which derived from a combustion aid tungsten oxide (VI), elutes within 15 minutes, enabling high-speed analysis.
If the sample combustion pretreatment device is not in use, it can be used as a stand-alone ion chromatography system using the autosampler or manual injector on the ion chromatography side.

Can be connected with either IC-8100EX or IC-8100ST

IC-8100EX

Sample combustion pretreatment device

Analysis of combustion ion chromatography



a) Standard (aqueous solution)
b) Polyethylene
c) Polycarbonate

Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 9.0 mmol/L $NaHCO_3$ +1.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.0 mL/min
Injection vol. : 100 µL
Detection : Conductivity
Temperature : 40 °C

IC WorkStation

IC-8100-WS

Streamlining routine analysis and variety of functions
IC-8100 series dedicated program pursuing "ease of use"

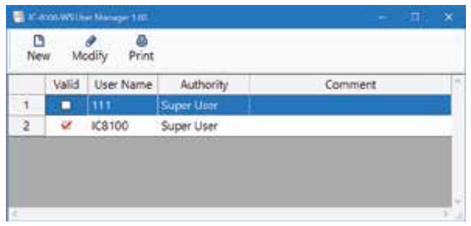
IC-8100-WS workstation is a program with system control, data analysis, and data management functions.
Two systems can be controlled, analyzed, and managed with 1 PC.

Easy operation with 3 applications and various tools

- User manager application / user authority setting and registration management
- Acquisition application / system control, data acquisition
- Analysis application / Data analysis, data management
- Log management tool / log confirmation, audit trail tracking
- Validation tool / System evaluation such as noise, detection limit, trueness, precision etc.

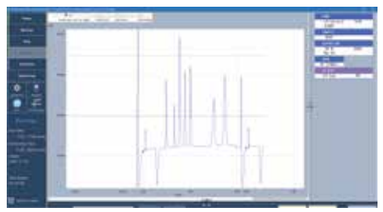
User manager application

User ID can be managed by User Name and Password.
Authentication and authorization of the ID, as well as audit trail can be verified.



Acquisition application

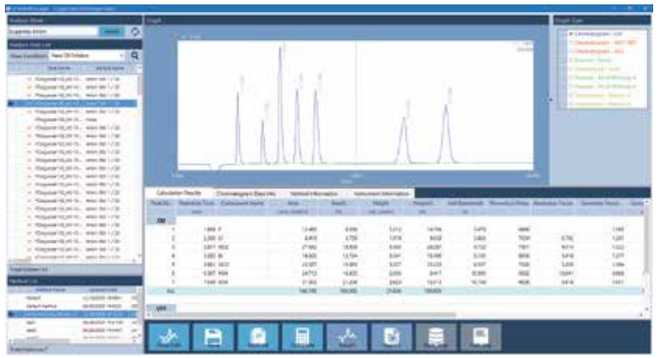
Detector signal, system pressure, system status, measurement status and measurement input request can be monitored on one screen.
Startup system with automatic startup and timer, manage the remaining amount of reagent used can be done too.



*Maximize each screen with a single mouse click

Analysis application

As soon as the peak integration condition is changed, recalculation will be executed and reflected in result column.
Automatic peak integration parameters can be easily set, the complexity of data analysis can be greatly reduced.

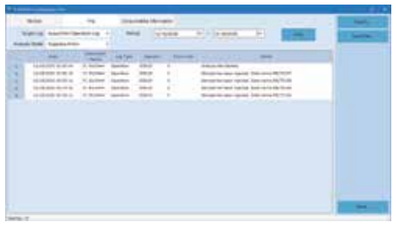


Automatic peak integration setting screen

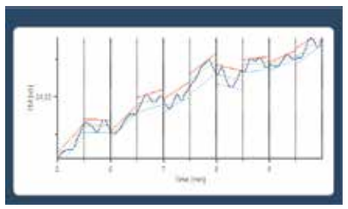
Calibration curve conditions setting screen

Log management tool・Validation tool

All logs are saved in the acquisition and analysis application, and can be checked from the log management tool.
System status and audit trail of data processing can be checked and reviewed.
From the analyzed data, the trueness, precision, detection limit and the baseline noise can be checked and evaluated.

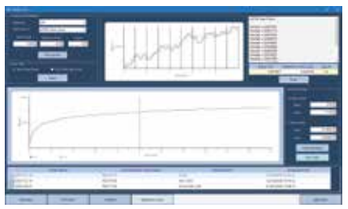


Log management tool



Noise checking

Evaluation of precision



Detection limit checking

IC-8100-WS Specification

System Control Function

Controllable Number	2 Systems
Device Connection	USB Cable
Control System	IC-8100 Series

Data Acquisition Function

Acquisition	2 Channels / System
Max. Acquisition Time	200 min
Acquisition Interval	10 mSec and above
Main Function	Automatic Startup and Shut Down Reagent Volume Warning System Monitor

Data Analysis Function

Calculation Method	Absolute Calibration Curve Method, Internal Standard Method
Peak Detection	Auto or Manual Peak Integration (with Batch Processing Function)
Main Function	Statistical Data Creation Baseline Noise Evaluation Analysis Trueness, Precision, Linearity Water Supply GLP Support Data Converter Function IC-2010 WS Data Compatibility

Data Integrity Support

User ID / Password Authentication, Audit Trail,
Password Expiration Setting, Logout When Inactivity, etc.

High-performance Ion Chromatography Columns

IC Columns for Anion analysis

For Suppressor Mode

TSKgel SuperIC-Anion HS
- For high-throughput analysis (general inorganic anions)
- High-throughput analysis within 5 minutes for seven standard anions (F, Cl, NO_2, Br, NO_3, PO_4, SO_4)
- High resolution by 3.5 µm particle size gel

TSKgel SuperIC-Anion HR
- Excellent resolution for organic acids and oxyhalides that elute quickly
- High resolution by 3.5 µm particle size gel

TSKgel SuperIC-WA
- High resolution for anions in tap water (F, Cl, ClO_2, ClO_3, BrO_3, NO_2, NO_3)
- Analysis within 10 minutes including SO_4 ion

TSKgel SuperIC-Anion
- For analysis of general inorganic anions
- Baseline separation between water dip and F

TSKgel SuperIC-AZ
- Possible to use wide range of organic solvents (e.g. methanol and acetonitrile) as eluent for separation selectivity adjustment, as well as column cleaning solution.

TSKgel SuperIC-AP
- Effective for analysis of fast eluting anions and anions with a strong hydrophobic character.

For Non-Suppressor Mode

TSKgel IC-Anion-PW$_{XL}$
- High resolution type
- For analysis of general inorganic anions and organic acids

TSKgel IC-Anion-SW
- Quartenary ammonium group binding on hydrophilic silica based gel
- For analysis of highly hydrophobic inorganic anions
- Effective for analysis of Iodide, thiocyanate, organic acids, etc.

Analytical Columns

Part No.	Product	Particle Size	Column Size	Ion Exchange Group	Shipping Solvent	Counter Ion
0022766	TSKgel SuperIC-Anion HS	3.5 µm	4.6 mm I.D. × 10 cm	Quaternary Ammonium Group	Eluent for column inspection※1	Carbonate Ion
0022894	TSKgel SuperIC-Anion HR	3.5 µm	4.6 mm I.D. × 15 cm	Quaternary Ammonium Group	Eluent for column inspection※1	Carbonate Ion
0023530	TSKgel SuperIC-WA	4.5 µm	4.6 mm I.D. × 10 cm	Quaternary Ammonium Group	Eluent for column inspection※2	Carbonate Ion
0019673	TSKgel SuperIC-Anion	5 µm	4.6 mm I.D. × 15 cm	Quaternary Ammonium Group	Eluent for column inspection※3	Borate Ion※7
0021444	TSKgel SuperIC-AZ	4 µm	4.6 mm I.D. × 15 cm	Quaternary Ammonium Group	Eluent for column inspection※4	Carbonate Ion
0019840	TSKgel SuperIC-AP	6 µm	4.6 mm I.D. × 15 cm	Quaternary Ammonium Group	Eluent for column inspection※5	Carbonate Ion
0019841	TSKgel SuperIC-AP	6 µm	4.6 mm I.D. × 7.5 cm	Quaternary Ammonium Group	Eluent for column inspection※5	Carbonate Ion
0014463	TSKgel IC-Anion-PW$_{XL}$	6 µm	4.6 mm I.D. × 3.5 cm	Quaternary Ammonium Group	Eluent for column inspection※6	Borate Ion※8
0018009	TSKgel IC-Anion-PW$_{XL}$ PEEK	6 µm	4.6 mm I.D. × 3.5 cm	Quaternary Ammonium Group	Eluent for column inspection※6	Borate Ion※8
0018010	TSKgel IC-Anion-PW$_{XL}$ PEEK	6 µm	4.6 mm I.D. × 7.5 cm	Quaternary Ammonium Group	Eluent for column inspection※6	Borate Ion※8
0006839	TSKgel IC-Anion-SW	5 µm	4.6 mm I.D. × 5 cm	Quaternary Ammonium Group	Methanol	Tartarate Ion

※1 : 3.8 mmol/L Sodium Hydrogen Carbonate
※2 : 5.0 mmol/L Sodium Hydrogen Carbonate + 3.5 mmol/L Sodium Carbonate
※3 : 6.0 mmol/L Sodium Tetraborate + 1.5 mmol/L Boric Acid + 0.2 mmol/L Sodium Hydrogen Carbonate
※4 : 6.3 mmol/L Sodium Hydrogen Carbonate + 1.7 mmol/L Sodium Carbonate
※5 : 1.7 mmol/L Sodium Hydrogen Carbonate + 1.8 mmol/L Sodium Carbonate
※6 : Boric-Gluconic Buffer Solution
※7 : Borate + Carbonate
※8 : Borate + Gluconate
＊TSKgel IC-Anion-PWXL is a stainless steel column (SUS316), IC-Anion-SW is a plastic column (flare fit type), and others are PEEK columns.

Guard Columns

Part No.	Product	Column Size	Remarks
0022767	TSKgel guardcolumn SuperIC-A HS	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-Anion HS, TSKgel SuperIC-Anion HR
0023531	TSKgel guardcolumn SuperIC-WA	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-WA
0019674	TSKgel guardcolumn SuperIC-A	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-Anion
0021445	TSKgel guardcolumn SuperIC-AZ	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-AZ
0019842	TSKgel guardcolumn SuperIC-AP	4.6 mm I.D. x 1 cm	For TSKgel SuperIC-AP

Guard Filter

Part No.	Product	Packaging	Remarks
0018014	Filter holder Kit (PEEK)	holder + filter element	For TSKgel IC-Anion PW$_{XL}$
0018021	Filter element PEEK	3 pieces	

IC Columns for Cation analysis

For Suppressor and Non-suppressor Mode

TSKgel SuperIC-Cation HSⅡ
- For high-throughput analysis (mono-valent and di-valent cations)
- High-throughput analysis within 5 minutes for six standard cations (Li, Na, NH_4, Mg, Ca, K)
- High resolution is realized by 3 µm particle size gel

TSKgel SuperIC-CR
- For analysis of monovalent, divalent cations
- High resolution for Na and NH_4

TSKgel IC-CationⅠ/ⅡHR
- Simultaneous analysis of monovalent and divalent cations with a simple eluent (nitric acid aqueous solution)

TSKgel IC-Cation
- Effective for analysis of alkali metals, alkaline earth metals, amines, etc.

TSKgel IC-Cation SW
- Effective for analysis of alkali metals, alkaline earth metals, amines, etc.
- Effective for analysis of highly hydrophobic amines

Analytical Columns

Part No.	Product	Particle Size	Column Size	Ion Exchange Group	Shipping Solvent	Counter Ion
0022837	TSKgel SuperIC-Cation HS II	3 µm	4.6 mm I.D. × 10 cm	Carboxyl Group	Eluent for column inspection※9	Hydrogen Ion
0021475	TSKgel SuperIC-CR	3 µm	4.6 mm I.D. × 15 cm	Carboxyl Group	Eluent for column inspection※10	Hydrogen Ion
0018677	TSKgel IC-Cation I/II HR	5 µm	4.6 mm I.D. × 10 cm	Carboxyl Group	Acetonitrile	Hydrogen Ion
0007171	TSKgel IC-Cation	10 µm	4.6 mm I.D. × 5 cm	Sulfonic Acid Group	2 mmol/L Nitric Acid	Hydrogen Ion
0008055	TSKgel IC-Cation-SW	5 µm	4.6 mm I.D. × 5 cm	Sulfonic Acid Group	Methanol	Hydrogen Ion

※9 : 4.0 mmol/L methanesulfonic acid + 1.1 mmol/L 18-crown 6-ether
※10 : 2.2 mmol/L methanesulfonic acid + 1.0 mmol/L 18-crown 6-ether
＊TSKgel IC-Cation I / II HR is a stainless steel column (SUS316), TSKgel IC-Cation, IC-Cation-SW are plastic columns (flare fit type), and others are PEEK columns.

Guard Columns

Part No.	Product	Column Size	Remarks
0022840	TSKgel guardcolumn SuperIC-C HS II	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-Cation HS II
0021476	TSKgel guardcolumn SuperIC-CR	4.6 mm I.D. × 1 cm	For TSKgel SuperIC-CR
0018678	TSKgel guardcolumn IC-Cation I/II HR	4.6 mm I.D. × 0.5 cm	For TSKgel IC-Cation I/II HR
0007172	TSKgel guardcolumn IC-C	4.6 mm I.D. × 1 cm	For TSKgel IC-Cation

Columns for Simultaneous Analysis of Anion and Cation

TSKgel SuperIC-A/C
- Simultaneous analysis of anion and cation is realized by the use of ion-exclusion mode and ion-exchange mode.
- Ion balance which is required in acid rain monitoring can be measured easily.

※ This method uses the joint patent of National Institute of Advanced Industrial Science and Technology (AIST), Chubu Center and Tosoh. (Japan Patent No.2055752)

Analytical Columns

Part No.	Product	Particle Size	Column Size	Shipping Solvent
0019843	TSKgel SuperIC-A/C	4 µm	6.0 mm I.D. × 15 cm	Water

Guard Columns

Part No.	Product	Column Size	Remarks
0019844	TSKgel guardcolumn SuperIC-A/C	4.6 mm I.D. × 2 cm	For TSKgel SuperIC-A/C

Column Connecting Parts

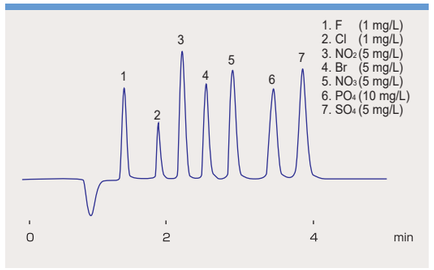
Part No.	Product	Packaging
0022106	Connecting Pipe Set ※11	2 sets
0017898	Union 1/16" PEEK※11	5
0022460	Handy Connector PEEK	2

※11 These are the connecting parts to connect TSKgel IC-Anion-SW, TSKgel IC-Cation and TSKgel IC-Cation-SW to IC-8100 and IC-2010,

Anion

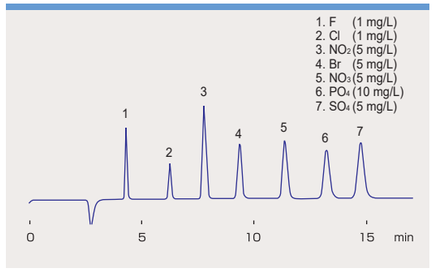
Application Data

Separation of Standard Anions



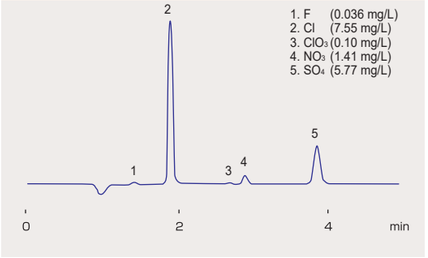
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 3.8 mmol/L $NaHCO_3$ + 3.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 1.5 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Standard Anions



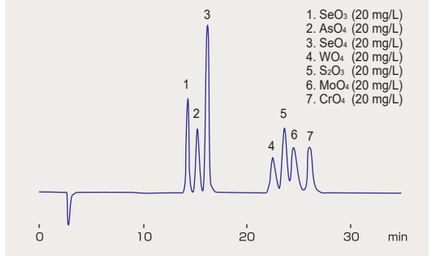
Column : TSKgel SuperIC-AZ (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AZ (4.6 mm I.D. x 1 cm)
Eluent : 1.9 mmol/L $NaHCO_3$ + 3.2 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 0.8 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Tap Water



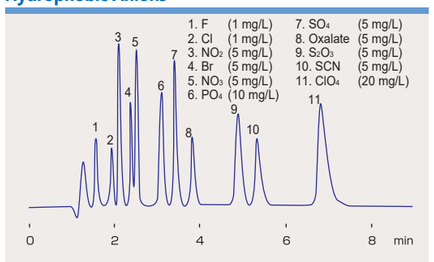
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 3.8 mmol/L $NaHCO_3$ + 3.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 1.5 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Hydrophobic Anions



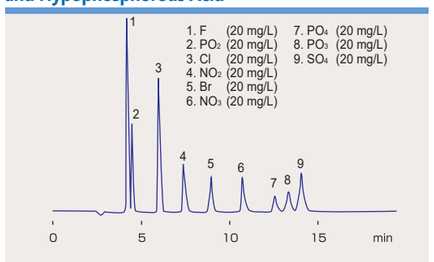
Column : TSKgel SuperIC-AZ (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AZ (4.6 mm I.D. x 1 cm)
Eluent : 1.9 mmol/L $NaHCO_3$ + 3.2 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 0.8 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Standard Anions Containing Hydrophobic Anions



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent A : 5.7 mmol/L $NaHCO_3$ + 4.5 mmol/L Na_2CO_3
+ 20 % Acetonitrile
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 1.2 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Phosphoric Acid, Phosphorous Acid and Hypophosphorous Acid



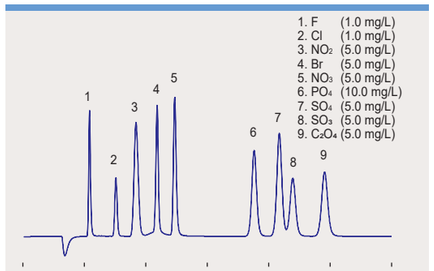
Column : TSKgel SuperIC-AZ (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AZ (4.6 mm I.D. x 1 cm)
Eluent : 1.9 mmol/L $NaHCO_3$ + 3.2 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 0.8 mL/min Temperature : 40 °C
Injection vol. : 30 µL

ION CHROMATOGRAPHY SYSTEM

Anion

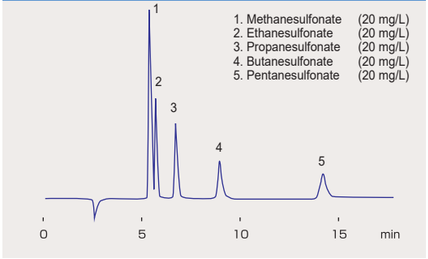
Application Data

Separation of Standard Anions with Sulfite & Oxalate



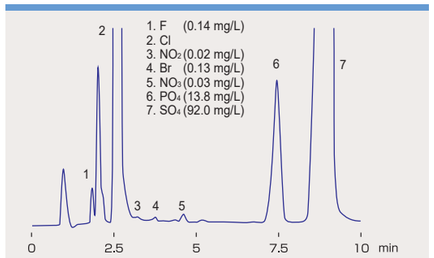
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 1.7 mmol/L $NaHCO_3$ + 1.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 1.2 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Alkylsulfonates



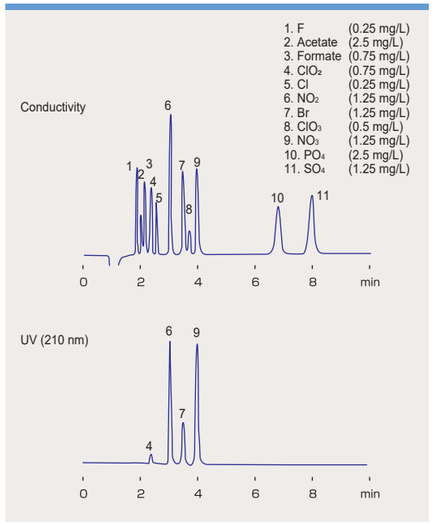
Column : TSKgel SuperIC-AZ (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AZ (4.6 mm I.D. x 1 cm)
Eluent : 6.3 mmol/L $NaHCO_3$ + 1.7 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 0.8 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Analysis of Sewage Treatment Plant Water



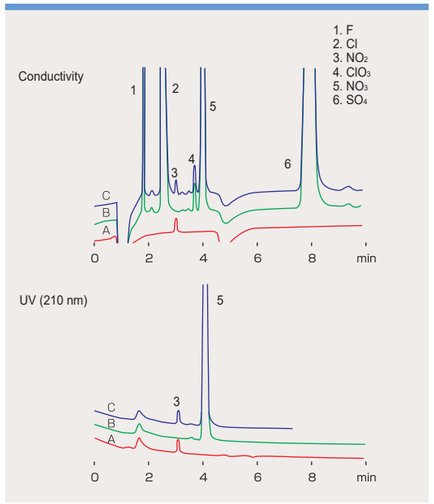
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 7.5 mmol/L $NaHCO_3$ + 0.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A Detection : Conductivity
Flow rate : 1.5 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Anions for Water Quality Control



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 7.5 mmol/L $NaHCO_3$ + 0.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.5 mL/min Detection : Conductivity, UV (210 nm)
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Nitric Nitrogen in Tap Water

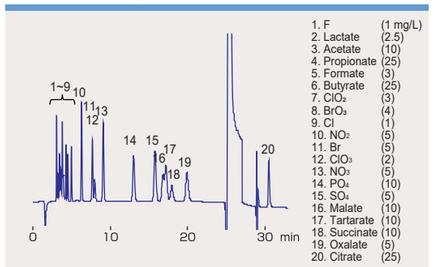


Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 7.5 mmol/L $NaHCO_3$ + 0.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.5 mL/min Detection : Conductivity, UV (210 nm)
Injection vol. : 100 µL Temperature : 40 °C
A : Standard nitrite ion (0.004 mg/L as NO_2-N)
B : Tap water (no nitrite ion added)
C : Tap water (nitrite ion spiked, 0.004 mg/L as NO_2-N)
※ Ethylenediamine solution (50 mg/mL) is added in each samples (1 ml/L).

Anion

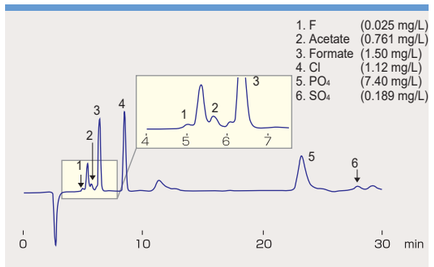
Application Data

Separation of Organic Acids



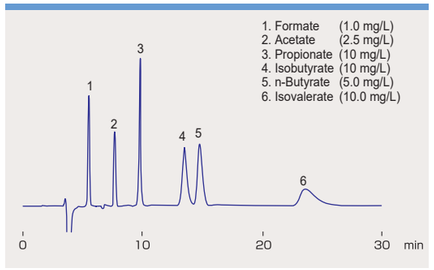
Column : TSKgel SuperIC-Anion HR (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : Eluent A 2.2 mmol/L $NaHCO_3$ + 2.7 mmol/L Na_2CO_3
Eluent B 12 mmol/L $NaHCO_3$ + 15 mmol/L Na_2CO_3 + 20 % Acetonitrile
Gradient : 0 min (100 % A) → 23 min (100 % B) →
31 min (100 % A) → 43 min (Injection of next sample)
Suppressor : TSKgel suppress IC-A Suppressor valve switching : 26 min, 30 min, 34.5 min
Detection : Conductivity Flow rate : 1.5 mL/min
Temperature : 40 °C Injection vol. : 30 µL

Analysis of Industrial Waste Water



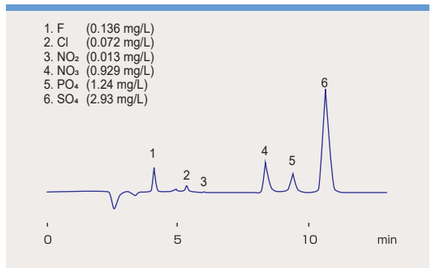
Column : TSKgel SuperIC-AP (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AP (4.6 mm I.D. x 1 cm)
Eluent : 1.7 mmol/L $NaHCO_3$ + 1.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Industrial Waste Water



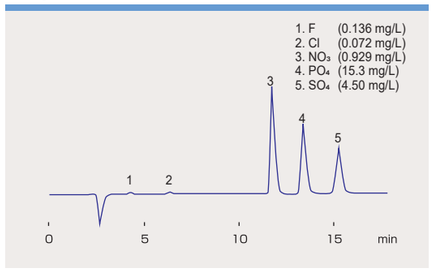
Column : TSKgel SCX (6.0 mm I.D. x 15 cm) X2
Eluent : 0.2 mmol/L H_3PO_4
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Soil Extract



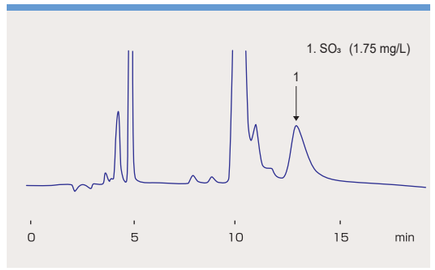
Column : TSKgel SuperIC-Anion (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A (4.6 mm I.D. x 1 cm)
Eluent : 6.0 mmol/L $Na_2B_4O_7$ + 15 mmol/L H_3BO_3 + 0.2 mmol/L $NaHCO_3$
Suppressor : TSKgel suppress IC-A
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Solid Fertilizer



Column : TSKgel SuperIC-AZ (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-AZ (4.6 mm I.D. x 1 cm)
Eluent : 1.9 mmol/L $NaHCO_3$ + 3.2 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Sulfite in Disposable Chopsticks



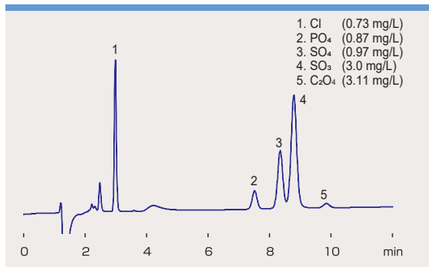
Column : TSKgel SuperIC-Anion (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A (4.6 mm I.D. x 1 cm)
Eluent : 6.0 mmol/L $Na_2B_4O_7$ + 50 mmol/L H_3BO_3 + 0.2 mmol/L $NaHCO_3$
Suppressor : TSKgel suppress IC-A
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 10 µL Temperature : 40 °C

ION CHROMATOGRAPHY SYSTEM

Anion

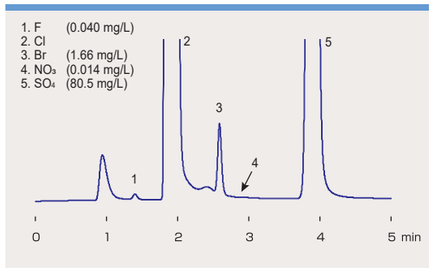
Application Data

Analysis of Boiler Water



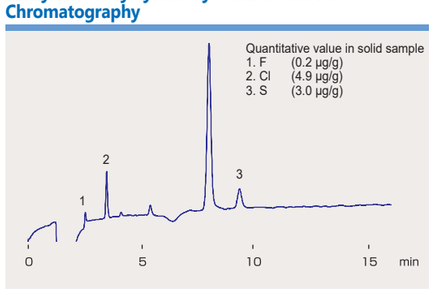
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 1.7 mmol/L $NaHCO_3$ + 1.8 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.2 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C
(Sulfite ion is added to the sample for analysis)

Analysis of Sea Water



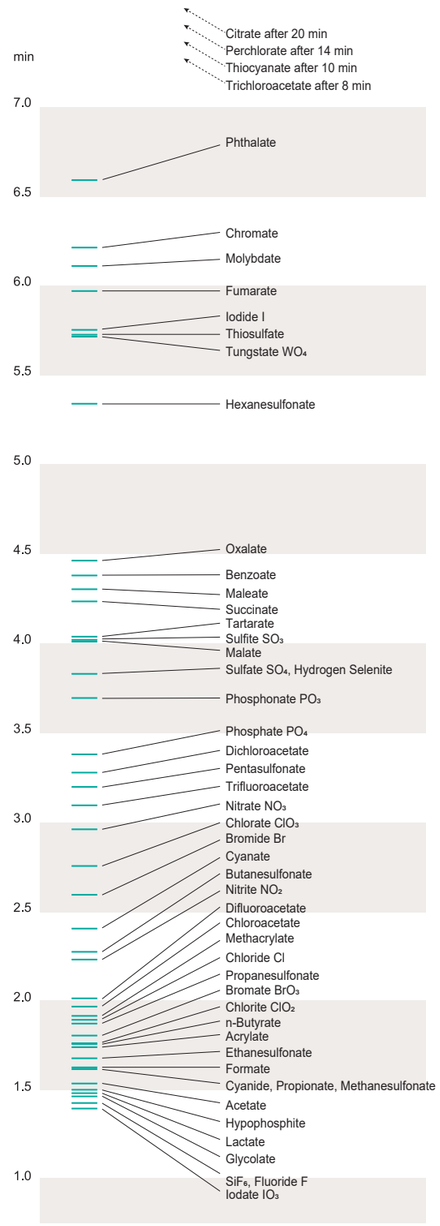
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 3.8 mmol/L $NaHCO_3$ + 3.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.5 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C
(20-fold dilution before injection)

Analysis of Polystyrene by Combustion Ion Chromatography



Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 9.0 mmol/L $NaHCO_3$ + 1.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.0 mL/min Detection : Conductivity
Injection vol. : 100 µL Temperature : 40 °C

TSKgel SuperIC-Anion HS Retention Time Index



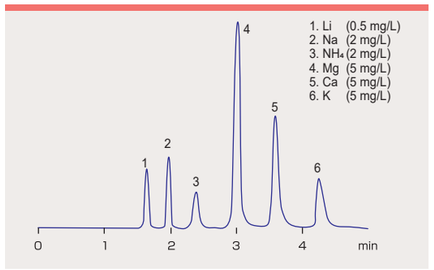
Column : TSKgel SuperIC-Anion HS (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-A HS (4.6 mm I.D. x 1 cm)
Eluent : 3.8 mmol/L $NaHCO_3$ + 3.0 mmol/L Na_2CO_3
Suppressor : TSKgel suppress IC-A
Flow rate : 1.5 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

※ The above mentioned elution time is a rough guide

Cation

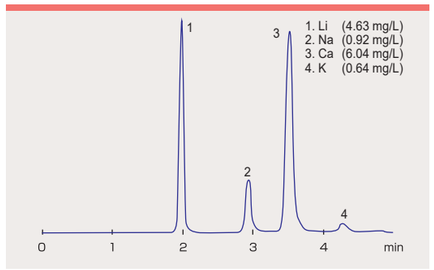
Application Data

Separation of Standard Cations



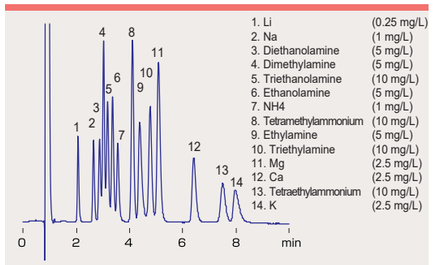
Column : TSKgel SuperIC-Cation HSⅡ(4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-C HSⅡ(4.6 mm I.D. x 1 cm)
Eluent : 4.0 mmol/L Methanesulfonic acid + 1.1 mmol/L 18-Crown-6
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 1.2 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Analysis of Tap Water



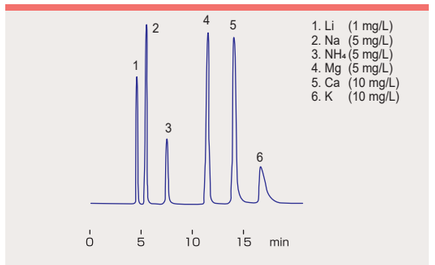
Column : TSKgel SuperIC-Cation HSⅡ(4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-C HSⅡ(4.6 mm I.D. x 1 cm)
Eluent : 4.0 mmol/L Methanesulfonic acid + 1.1 mmol/L 18-Crown-6
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 1.2 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Standard Cations



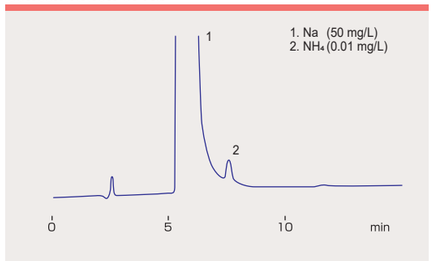
Column : TSKgel SuperIC-Cation HSⅡ(4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-C HSⅡ(4.6 mm I.D. x 1 cm)
Eluent : 3.0 mmol/L Methanesulfonic acid + 2.7 mmol/L 18-Crown-6
Flow rate : 1.0 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Separation of Standard Cations



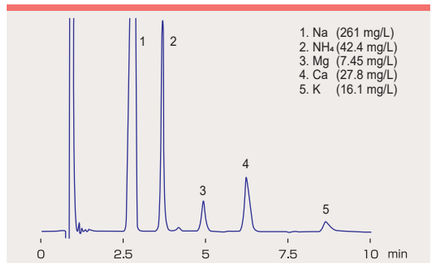
Column : TSKgel SuperIC-CR (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-CR (4.6 mm I.D. x 1 cm)
Eluent : 2.2 mmol/L Methanesulfonic acid + 1.0 mmol/L 18-Crown-6 + 0.5 mmol/L L-Histidine
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 0.7 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Trace Level of NH_4-N in High Concentration of Na



Column : TSKgel SuperIC-CR (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-CR (4.6 mm I.D. x 1 cm)
Eluent : 2.2 mmol/L Methanesulfonic acid + 1.0 mmol/L 18-Crown-6 + 0.5 mmol/L L-Histidine
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 0.7 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Analysis of Sewage Treatment Plant Water

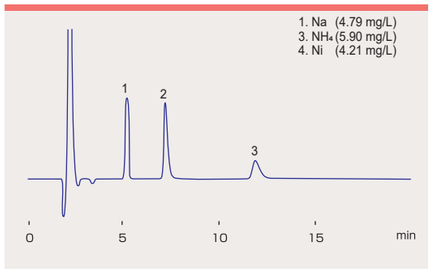


Column : TSKgel SuperIC-Cation HSⅡ(4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-C HSⅡ(4.6 mm I.D. x 1 cm)
Eluent : 3.0 mmol/L Methanesulfonic acid + 2.7 mmol/L 18-Crown-6
Flow rate : 1.0 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Cation

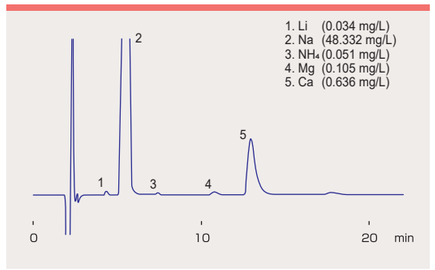
Application Data

Analysis of Nickel Plating Solution



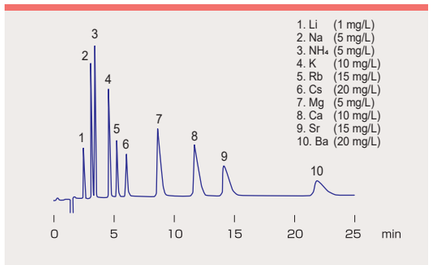
Column : TSKgel SuperIC-CR (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-CR (4.6 mm I.D. x 1 cm)
Eluent : 2.2 mmol/L Methanesulfonic acid + 1.0 mmol/L 18-Crown-6
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 0.7 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Analysis of Hot Spring Water



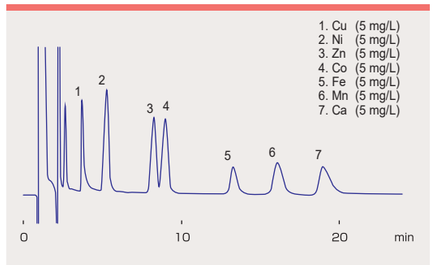
Column : TSKgel SuperIC-CR (4.6 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-CR (4.6 mm I.D. x 1 cm)
Eluent : 2.2 mmol/L Methanesulfonic acid + 1.0 mmol/L 18-Crown-6
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 0.7 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Separation of Standard Cations



Column : TSKgel IC-Cation Ⅰ/Ⅱ HR (4.6 mm I.D. x 10 cm)
Eluent : 2 mmol/L Nitric acid
Flow rate : 0.8 mL/min Detection : Conductivity
Injection vol. : 20 µL Temperature : 40 °C

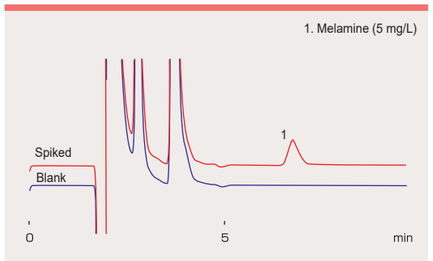
Separation of Heavy-metal Ions



Column : TSKgel IC-Cation-SW (4.6 mm I.D. x 7.5 cm)
Eluent : 3.5 mmol/L Ethylenediamine + 10 mmol/L Citric acid
Flow rate : 1.0 mL/min Detection : Conductivity
Injection vol. : 200 µL Temperature : 40 °C

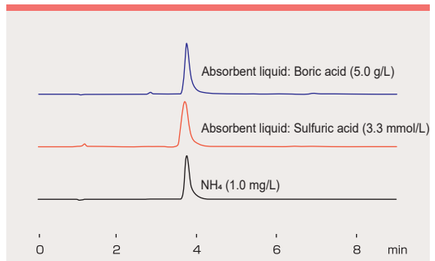
※ The above column size is custom size.
Please contact our sales representative for the purchase.

Analysis of Melamine in Milk



Column : TSKgel IC-Cation Ⅰ/Ⅱ HR (4.6 mm I.D. x 10 cm)
TSKgel guardcolumn IC-Cation Ⅰ/Ⅱ HR (4.6 mm I.D. x 10 cm)
Eluent : 3.0 mmol/L Nitric acid/Acetonitrile = 9/1
Flow rate : 0.7 mL/min Detection : Conductivity
Injection vol. : 30 µL Temperature : 40 °C

Analysis of Ammonium in Exhaust Gas

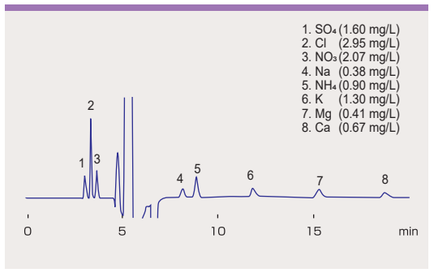


Column : TSKgel SuperIC-Cation HSⅡ(4.6 mm I.D. x 10 cm)
TSKgel guardcolumn SuperIC-C HSⅡ(4.6 mm I.D. x 1 cm)
Eluent : 3.0 mmol/L Methanesulfonic acid + 2.7 mmol/L 18-Crown-6
Suppressor : TSKgel suppress IC-C Detection : Conductivity
Flow rate : 1.0 mL/min Temperature : 40 °C
Injection vol. : 30 µL

Anion/Cation Simultaneous Analysis

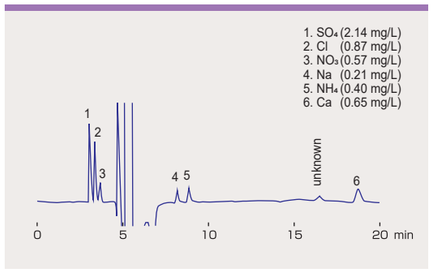
Application Data

Separation of Standard Anions/Cations



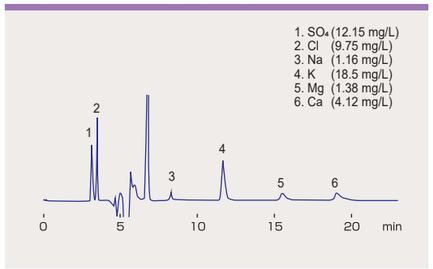
Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Analysis of Rain Water



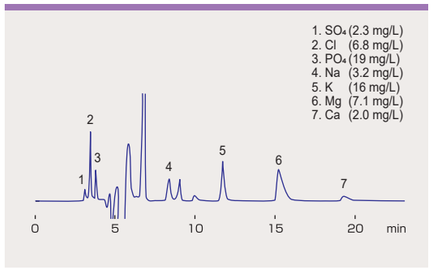
Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Analysis of Brown Sugar (5 g/L)



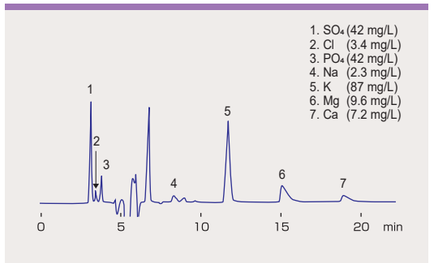
Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Analysis of Rice Vinegar (25-fold Dilution)



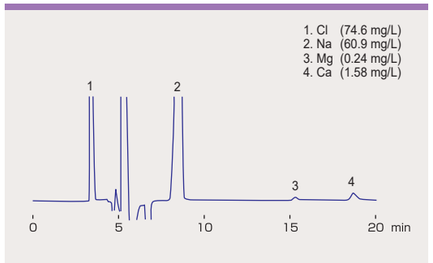
Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Separation of Red Wine (10-fold Dilution)



Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Analysis of Infusion Solution (50-fold Dilution)



Column : TSKgel SuperIC-A/C (6.0 mm I.D. x 15 cm)
TSKgel guardcolumn SuperIC-A/C (4.6 mm I.D. x 2 cm)
Eluent : 6 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5 % Acetonitrile
Flow rate : 0.6 mL/min Detection : Conductivity
Temperature : 40 °C Injection vol. : 30 µL

Eluent Preparation Manual

For Anion Analysis

TSKgel SuperIC-Anion HS (Standard Condition)

Eluent Composition	3.8 mmol/L Sodium Hydrogen Carbonate + 3.0 mmol/L Sodium Carbonate
Reagent	Sodium Hydrogen Carbonate ····· 319 mg
	Sodium Carbonate (anhydrous) ····· 318 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-Anion HS (High Resolution Condition)

Eluent Composition	7.5 mmol/L Sodium Hydrogen Carbonate + 0.8 mmol/L Sodium Carbonate
Reagent	Sodium Hydrogen Carbonate ····· 630 mg
	Sodium Carbonate (anhydrous) ····· 85 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-Anion HR

Eluent Composition	2.2 mmol/L Sodium Hydrogen Carbonate + 2.7 mmol/L Sodium Carbonate
Reagent	Sodium Hydrogen Carbonate ····· 185 mg
	Sodium Carbonate (anhydrous) ····· 286 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-WA

Eluent Composition	5.0 mmol/L Sodium Hydrogen Carbonate + 3.5 mmol/L Sodium Carbonate
Reagent	Sodium Hydrogen Carbonate ····· 420 mg
	Sodium Carbonate (anhydrous) ····· 371 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-AZ

Eluent Composition	1.9 mmol/L Sodium Hydrogen Carbonate + 3.2 mmol/L Sodium Carbonate
Reagent	Sodium Hydrogen Carbonate ····· 160 mg
	Sodium Carbonate (anhydrous) ····· 339 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

For Cation Analysis

TSKgel SuperIC-Cation HS Ⅱ (Standard Condition)

Eluent Composition	4.0 mmol/L Methanesulfonic Acid + 1.1 mmol/L 18-Crown-6
Reagent	2 mol/L Methanesulfonic Acid solution ····· 2.0 mL
	18-Crown-6 ····· 291 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-Cation HS Ⅱ (High Resolution Condition)

Eluent Composition	3.0 mmol/L Methanesulfonic Acid + 2.7 mmol/L 18-Crown-6
Reagent	2 mol/L Methanesulfonic Acid solution ····· 1.5 mL
	18-Crown-6 ····· 714 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

TSKgel SuperIC-CR

Eluent Composition	2.2 mmol/L Methanesulfonic Acid + 1.0 mmol/L 18-Crown-6 + 0.5 mmol/L L-histidine
Reagent	2 mol/L Methanesulfonic Acid solution ····· 1.1 mL
	18-Crown-6 ····· 264 mg
	L-histidine ····· 78 mg
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

For Anion/Cation Simultaneous Analysis

TSKgel SuperIC-A/C

Eluent Composition	6.0 mmol/L 18-Crown-6 + 0.45 mmol/L 5-Sulfosalicylic Acid + 5 mmol/L L-Tartaric Acid + 5% (v/v) Acetonitrile
Reagent	5-Sulfosalicylic Acid ····· 114 mg
	L-Tartaric Acid ····· 751 mg
	18-Crown-6 ····· 1.6 g
	Acetonitrile ····· 50 mL
Preparation Method	Dissolve the above weighed reagent with ultrapure water and top up to 1 L

※ Since 18-crown-6 is poorly soluble, it is desirable to use the ultrasonicator.
※ In order to minimize the preparation error, it is recommended to prepare a 10-fold concentrated stock eluent at first and then dilute it.

Consumables and Accessories for Ion Chromatography

Suppressor Gel

Suppressor Gel for Ion Chromatography

Suppressor gel is used for suppressor analysis with Tosoh IC System.

Suppressor Gel for Anion Analysis

Part No.	Product	Packaging	Measurerable Sample Number	Remarks
0022770	TSKgel suppress IC-A	30 mL x 10 bottles	150 samples / bottle	For IC-8100 / IC-2010
0022771	TSKgel suppress IC-A	60 mL x 5 bottles	300 samples / bottle	For IC-8100 / IC-2010
0023518	TSKgel suppress IC-A	30 mL x 4 bottles	150 samples / bottle	For IC-8100 / IC-2010
0019675	TSKgel suppress IC-A	20 mL x 10 bottles	100 samples / bottle	For IC-2001

Suppressor Gel for Cation Analysis

Part No.	Product	Packaging	Measurerable Sample Number	Remarks
0022772	TSKgel suppress IC-C	30 mL x 10 bottles	150 samples / bottle	For IC-8100 / IC-2010
0022773	TSKgel suppress IC-C	60 mL x 5 bottles	300 samples / bottle	For IC-8100 / IC-2010
0023519	TSKgel suppress IC-C	30 mL x 4 bottles	150 samples / bottle	For IC-8100 / IC-2010
0020310	TSKgel suppress IC-C	20 mL x 10 bottles	100 samples / bottle	For IC-2001

The expiration date of suppressor gel for anion analysis is 2 years manufactured date, while suppressor gel for cation analysis is 1 year from manufactured date

Eluent Concentrates

Eluent Concentrates for Ion Chromatography

The eluent concentrate is used to prepare eluent for analysis by Tosoh IC columns.
Eluent can be prepared automatically using ES-8100.

Part No.	Product	Packaging	Concentration Ratio	Corresponding column
0023533	TSKgel eluent Conc. IC-A HS-5	200 mL x 4 bottles	10 times	TSKgel SuperIC-Anion HS / For standard analysis
0023534	TSKgel eluent Conc. IC-A HS-10	200 mL x 4 bottles	10 times	TSKgel SuperIC-Anion HS / For high resolution analysis
0023535	TSKgel eluent Conc. IC-WA	200 mL x 4 bottles	10 times	TSKgel SuperIC-WA / For water quality analysis

Sample Cup

Part No.	Product	Specification	Packaging
0019736	Sample cup	PP, capacity 0.7 mL	1000 pieces
0019737	Cap	PE, for 0019736	1000 pieces
0024577	Sample cup	PP, capacity 1.5 mL	1000 pieces
0024578	Cap	PP, for 0024577	1000 pieces
0022469	Dilution sample cup	PP	100 pieces

Sample Cup

Dilution Sample Cup

Other Accessories and Consumables

Part No.	Product	Specification	Packaging	Remarks
0024524	IC bottle kit	PP 2L bottle, with connection joint	1 set	Accessory for ES-8100
0024523	IC bottle	PP 2L bottle, with lid	1 set	-
0024539	Cylinder type filter set	PE	1 set	Accessory for RS-8100
0024540	Replacement filter	PE, for 0024539	5 pieces	Accessory for RS-8100
0024576	Pretreatment filter W-25-5		5 pieces	Accessory for ES-8100

The IC bottle kit is delivered as an accessory when you purchase the ES-8100. It is not included with other systems, so please purchase it separately if needed.

IC Bottle Kit

Syringe and Sample Loop for Manual Injection

Part No.	Product	Specification	Packaging	Remarks
0022408	Sample loop 30 µL	PEEK	1 set	Accessory for IC-8100EX / ST
0022409	Sample loop 100 µL	PEEK	1 set	Accessory for IC-8100EX / ST
0024541	Sample loop 300 µL	PEEK	1 set	-
0022410	Sample loop 500 µL	PEEK	1 set	-
0024579	Injection syringe for ST	PP, PE	100 pieces	Accessory for IC-8100ST

Cylinder Type Filter Set

Injection Syringe for ST

Filters & Cartridges for Sample Pretreatment

Pretreatment Filter Series

Pretreatment filter is a disposable disc filter developed for sample pretreatment of HPLC.
It can contribute to column life extension and improvement of data reproducibility.

Part No.	Product	Pore Size (µm)	Amount of Residual Liquid (µL)	Size (Φ x L, mm)	Packaging (pcs/box)
0016145	W-3-2	0.2	<10	7 x 19	100
0016146	W-13-2	0.2	<30	18 x 19	100
0016147	W-25-2	0.2	<100	30 x 24	100
0016148	W-3-5	0.45	<10	7 x 19	100
0016149	W-13-5	0.45	<30	18 x 19	100
0016150	W-25-5	0.45	<100	30 x 24	100

Membrane Material	Cellulose Acetate
Housing Material	Polypropylene
Possible Sterilization Method	Ethylene Oxide Gas
Connection	Lure Lock / Lure Slip

TOYOPAK® Series

TOYOPAK is a solid phase extraction cartridge. Various kinds of gel are packed in the PP housing.
It is easy to operate due to disposable type.

Part No.	Product	Ion Exchange Group	Amount of Gel	Ion Exchange Capacity
0008489	TOYOPAK IC-SP M	Sulfopropyl Group	1.0 mL	0.4 meq
0008592	TOYOPAK DEAE M	Diethylaminoethyl Group	1.0 mL	0.1 meq
0008487	TOYOPAK ODS M	Octadecyl Group	300 mg	—

※ Packaging unit: 50 pieces / box

Configuration for IC-8100 Series System Unit

◎ ··· Required
○ ··· Recommended
△ ··· Optional
× ··· Not Selectable

System Unit

Part No.	Product	Manual Injection: General Anion Analysis	Manual Injection: General Cation Analysis	Manual Injection: General Anion/Cation Simultaneous Analysis *1	Manual Injection: Online Combustion Pretreatment Analysis *2	With Autosampler: General Anion Analysis	With Autosampler: General Cation Analysis	With Autosampler: Anion/Cation 2 System Injection	With Autosampler: General Anion/Cation Simultaneous Analysis *1	With Autosampler: Online Combustion Pretreatment Analysis *2
0024500	IC-8100EX basic unit	-	-	-	-	◎	◎	◎	◎	◎
0024501	IC-8100ST basic unit	◎	◎	◎	◎	-	-	◎	-	-
0024503	UV-8100 UV-Vis Detector	△	△	×	△	△	△	△	×	△
0024505	ES-8100 Automatic Eluent Supply Unit	×	×	×	×	△	△	△	△	△
0024587	2 System Injection Tubing Kit	-	-	-	-	-	-	◎	-	-
See p.11	External I / O Terminal Kit	△	△	△	◎	△	△	△	△	◎
Column										
See p.14	Analytical column for anions	◎	-	-	◎	◎	-	◎	-	-
See p.15	Analytical column for cations	-	◎	-	-	-	◎	◎	-	◎
0024503	TSKgel SuperIC A/C	-	-	◎	-	-	-	-	◎	-
0024505	TSKgel SuperIC-WA	-	-	-	-	-	-	-	-	-
0024587	TSKgel SCX (Na^+)	-	-	-	-	-	-	-	-	-
See p.14 &15	Guard Column	○	○	○	○	○	○	○	○	○
Suppressor Gel, Eluent Concentrate										
See p.24	TSKgel suppress IC-A	○	-	-	○	○	-	○	-	○
See p.24	TSKgel suppress IC-C	-	○	-	-	-	○	○	-	-
See p.24	TSKgel eluent Conc. IC Series	-	-	-	-	○	-	○	-	-

* 1 General anion/cation simultaneous analysis is a non-suppressor analysis. For column details, see p. 15. For analysis example, please refer to p. 22.
* 2 Combustion pretreatment unit device is required for online combustion pretreatment analysis.

- The basic unit includes a degassing part, dual liquid feed pump, injector, column oven, suppressor unit, electrical conductivity detector, and dedicated workstation. Both suppressor analysis and non-suppressor analysis are possible.
- The dedicated workstation can control and analyze two basic units, and each unit can capture data from two detector signals.
- The above is part of the configuration. Please contact us or our distributor for details.

IC-8100 Series Specification

Ion Chromatography IC-8100EX / IC-8100ST

Measurement Mode		Suppressor Method
		Non-suppressor Method
Degasser		Vacuum Degassing System
Liquid Feed Part	Liquid Feed Pump	Dual Plunger System
	Flow Rate Setting Range	0.10~5.00 mL/min
	Flow Rate Accuracy	Within ± 2 % (pure water) at 0.7~1.5 mL/min flow rate
	Flow Rate Precision	Within ± 0.2 % (pure water) at 0.7~1.5 mL/min flow rate
	Pressure Limit	35 MPa
	2 Eluent Switching Unit (option)	Switching by solenoid valve
Sample Injection Unit (IC-8100EX)	Built-in Autosampler	
	Injection Method	Loop injection, variable volume injection
	Number of Samples	100 (50 x 2 racks)
	Standard loop	30 µL
	Sample Injection Volume	10~500 µL (1 µL step)
	Automatic Dilution Function	2, 5, 10, 20, 50, 100 times
Sample Injection Unit (IC-8100ST)	Built-in Manual Injector	
	Injection Method	Loop injection
	Standard Loop	30 µL
Column Oven	Temperature Control Method	Aluminum block temperature control (PID control)
	Temperature Control Range	25~45 °C (1 °C step)
	Temperature Setting Accuracy	± 0.5 °C
	Temperature Control Precision	± 0.1 °C
	Maximum Storage	2 analytical columns (4.6 mm I.D. x 15 cm) + 1 guard column
Suppressor	Method	3 ports, suppressor gel replacement method
	Capacity	200 µL
CM Detector	Method	Four-pole electrode method
	Detection Range	50, 500, 5000, 15000 µS/cm
	Cell Capacity	0.6 µL
	Noise	Below 0.1 nS/cm
	Temperature Control	Conducted in column oven
Wetted Material		Non-metal other than detector
External Dimensions	IC-8100EX and IC-8100ST	400 (W) x 550 (H) x 450 (D) mm
Weight	IC-8100EX	37 kg
	IC-8100ST	29 kg
Installation Environment	Temperature	15~35 °C
	Humidity	40~80 %
Power Supply	IC-8100EX	AC100~240 V 50/60 Hz, 220 VA
	IC-8100ST	AC100~240 V 50/60 Hz, 160 VA

Automatic Eluent Supply Unit ES-8100

Degassing Part	Vacuum degassing method
Mixer Capacity	710 µL x 5
External Dimensions	235 (W) x 230 (H) x 115 (D) mm
Weight	3 kg
Power Source	From IC-8100EX

UV-Vis Detector UV-8100

Method		Dual beam, single flow cell
Light Source		Deuterium lamp and halogen lamp
Wetted Material		Non-metal
Wavelength Range		195~700 nm
Flow Cell	Capacity	13 µL
	Noise	1.5 x 10^{-5} ABU or less
External Dimensions		210 (W) x 165 (H) x 402 (D) mm
Power Source		From IC-8100EX / ST
Weight		8 kg

External I / O Terminal Kit

CM Terminal	CM Detector Signal Output	Analog output -1 to 1V
UV Terminal	UV-vis Detector Signal Output	Analog output -1 to 1V
EXT Terminal	Other Detector Signal Input	Analog input -1 to 1V
IN Terminal	Injection Signal or Error Signal Input	Contact input or TTL level input
OUT Terminal	Injection Signal or Error Signal Output	Relay contact output