

Anion Suppressor Ion Chromatograph

# HIC-ESP





Anion Suppressor Ion Chromatograph

# HIC-ESP

The HIC-ESP is a new anion suppressor ion chromatograph with built-in electroalytic suppressor, boasting the same low carryover and excellent injection precision characteristic of Shimadzu HPLCs to bring you highly-reliable results. The newly developed anion suppressor prevents peak spreading and achieves high sensitivity, providing stable functionality even over long periods of use.

The HIC-ESP is suitable for applications in a wide range of fields including environmental science, medicine, chemistry and food science.

- A newly-developed anion suppressor unit achieves high sensitivity and high reliability in analysis
- Complete support and ease-of-use throughout your workflow, from analysis through data processing to report creation
- Compact design for a more efficient use of lab space

### Conductivity Detector CDD-10AVP

A temperature-regulating device in the detection cell and the placement of the detection cell in the column oven ensure precise temperature control. This enables analysis with low noise conditions and a stable baseline even using electrical conductivity detection which is sensitive to temperature fluctuations.

### Degassing Unit DGU-403

Because the unit adopts an online degassing system with high performance and low internal volume, it is easy to replace the eluent and more stable analysis is achieved. Offline degassing of the eluent with ultrasonic waves or decompression is not necessary.

### Anion Suppressor Unit ICDS™-40A

This is an electroalytic suppressor unit which is built into the top part of the column oven. It achieves high performance even with low internal volume.



### Solvent Delivery Pump LC-20Ai

An inert-type pump that optimizes solvent delivery control. Detection of low-level noise is possible even using electrical conductivity detection which is sensitive to pressure changes.

### Column Oven CTO-40S

The forced air circulation oven has extremely precise temperature regulation, and can be used with a variety of column lengths up to 300 mm.

### Autosampler SIL-20A/20AC (Inert kit)

The SIL-20A/20AC is a full-volume autosampler with very low carryover, which allows high-accuracy, high-speed injections of volumes from 0.1 µL up. The wetted parts are made inert using the inert kit.

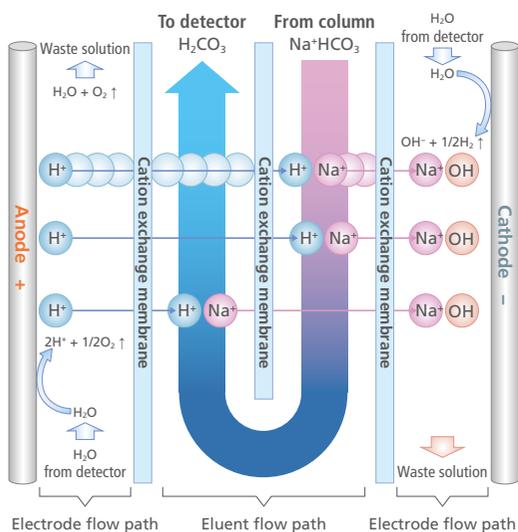
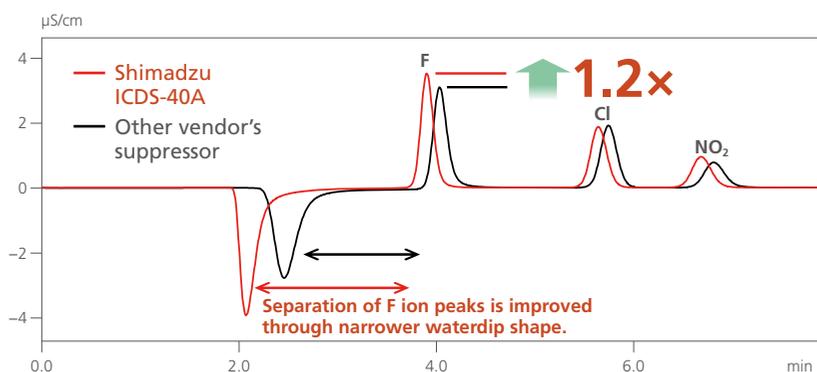


## High sensitivity and reliability

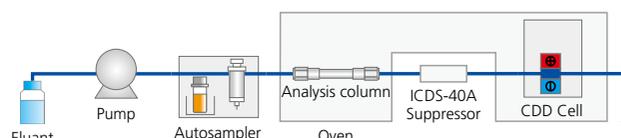
With a unique design where the eluent flow path bends back around, combined with optimized dialytic, the new ICDS-40A anion suppressor unit achieves higher efficiency and stable suppressing while maintaining a small internal volume (patent pending). Combining this suppressor with high-quality HPLC units enables highly-reliable analytical results.

### The ICDS-40A achieves high sensitivity, reliability and robustness

The ICDS-40A reduces peak spreading, increasing the sensitivity for components with low retention such as fluoride ions, and improves water dip separation, enabling highly-reliable results. Using an electrodialytic system which can carry out analysis and regenerations simultaneously, the analysis cycle time can be reduced and consecutive regeneration achieved, increasing the flexibility of the analysis time settings. In addition, the suppressor uses waste solution from the detector as regenerating solution, making environmentally-unfriendly regenerating solutions such as sulfuric acid unnecessary.

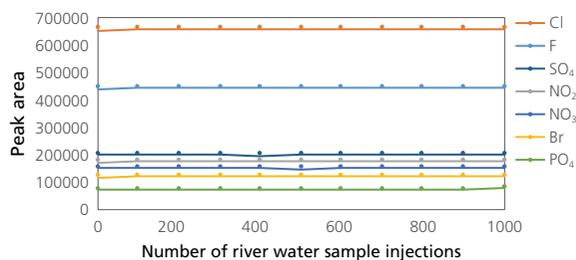


Structure and principles behind the ICDS-40A



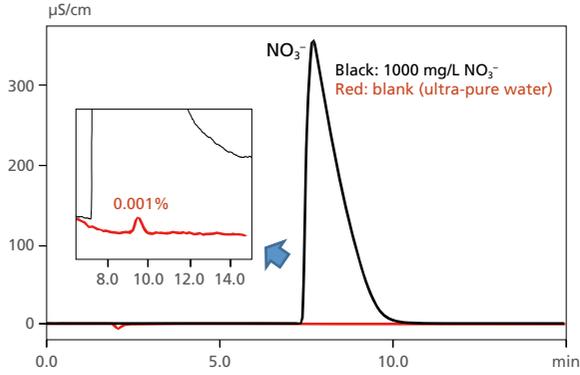
Flow-line diagram for the HIC-ESP

The plot on the right shows peak response from analysis of a standard solution after each 100 injections of river water. Even after a long, continuous analysis of the sample, the peak intensity for each ion is stable. The excellent ion exchange function of the ICDS-40A is supported by the robustness of the HIC-ESP over a long analysis.



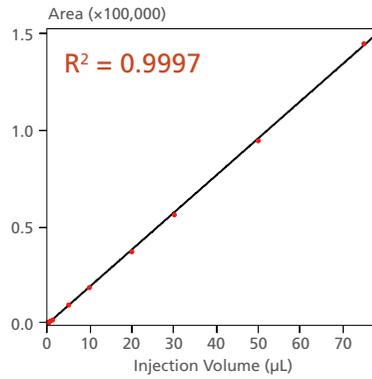
## High-quality HPLC units make up the HIC-ESP

This unique ion chromatograph combines various features indispensable to obtain highly-reliable analytical results: excellent solvent delivery performance, low carryover, injection speed (as low as 10 secs), sample injection precision and repeatability, precise oven temperature regulation and more.



Low carryover

\* Blank sample injected after analysis of 1000 mg/L  $\text{NO}_3^-$  standard solution.



Injection repeatability and volume precision

\* Analysis changing the injection volume of the standard solution 10 mg/L Br

Injection volume (µL)	Area RSD(%) (n=5)
0.2	1.05
1	0.86
10	0.25
20	0.04
50	0.04
75	0.08

## Compact design opens up lab space

The HIC-ESP system is just 420 mm wide, taking up significantly less space on the bench.



HIC-ESP

Width = 420 mm

Instrument from vendor B

Width = 780 mm +

Instrument from vendor A

Width = 800 mm +

# Complete support and ease-of-use throughout your workflow

## Manage analysis, data processing and reports all from LabSolutions™

Settings for HIC-ESP analysis parameters, continuous analysis, auto-shutdown, data processing, and report creation can all be managed from LabSolutions analysis software. Data integrity can be handled with the addition of LabSolutions DB and LabSolutions CS.



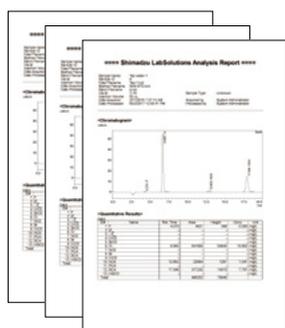
## Simple, all-in-one checks of calibration curves and peak integration with the results browser function

Ret. Time	Area	Height	Conc. (mg/L)	Accuracy (%)	Deviation	QC Check Results
2.126	11.822	3.172	1.231	100.1	0.018	
2.126	141.445	29.172	1.298	100.0	0.002	
2.413	296.795	11.888	4.223	100.0	0.001	
2.551	224.102	39.292	2.292	---	---	
2.437	83.226	15.512	0.825	---	---	Search Range: 2.000
2.124	171.754	17.473	2.263	---	---	
2.817	111.948	22.827	1.543	---	---	
2.524	182.254	17.641	2.161	100.0	0.001	
2.047.79	53.17426	53.18353	63.827938	0.107483	43.331799	
2.126	296.795	11.888	4.223	100.1	0.002	
2.413	63.074	15.512	0.815	100.0	0.004	
2.551	63.074	15.512	0.815	100.0	0.004	
3.001647	63.074	15.512	0.815	100.0	0.004	

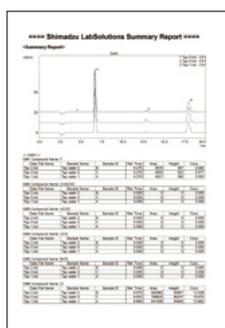
Automatic judgments on analytical results

Results can be checked and errors or outliers detected much more quickly, with the software automatically judging calibration curve validity, maximum and minimum limits for sample values, etc.

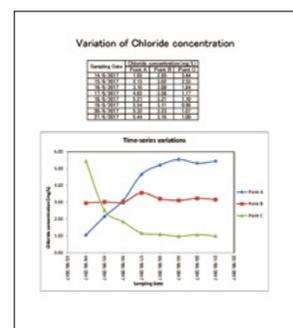
## Easily produce reports and summaries



Reports with detailed information about individual sample data



Summary report compiling data from multiple analyses



Multi-data report with graphs of data from multiple analyses

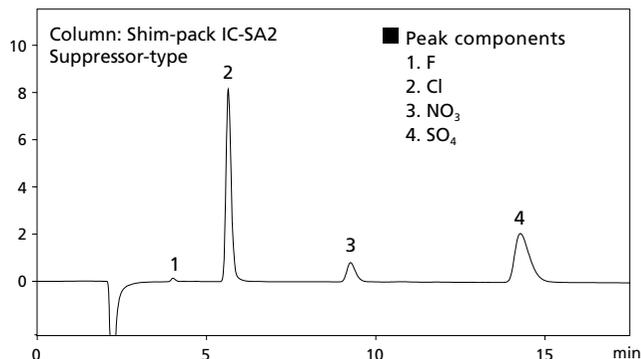
The report function allows the automatic creation of individual analysis or summary reports, as well as multi-data reports\* which can produce graphs and handle other data processing for results from multiple samples. The data can be automatically imported into a premade template, reducing the time needed to write reports and reducing the possibility of errors.

\* Multi-data reports are an optional LabSolutions DB/CS function

# Application

## ■ For environmental water analysis

The example on the right side shows an analysis of river water according to the standard method EPA 300.0 (Part A) prescribed by the US Environmental Protection Agency (EPA) for environmental water anion analysis.



## Related Products

### ■ Suppressor accessories

Product name	Part no.	Description
Suppressor and power supply set	228-74020-41	Includes the following parts: - Anion suppressor ICDS-40A - Suppressor power supply - Piping kit for connecting the suppressor
CTO-40S Suppressor Remodeling Kit	228-68371-41	Parts for mounting the suppressor to CTO-40S
Anion suppressor ICDS-40A (consumable)	228-74006-41	Suppressor for anion analysis



### ■ Column lineup for suppressor-type anion analysis

Type	Part no.	Column name	Size	Housing material	Resin / Functional group	Particle size	Features
Analytical column	228-38983-91	Shim-pack™ IC-SA2	4.0 mm I.D. × 250 mm L.	PEEK	Polyvinylalcohol / Quaternary ammonium	9 μm	General use column for suppressor-type anion analysis
	228-41600-91	Shim-pack IC-SA3	4.0 mm I.D. × 250 mm L.			5 μm	High performance anion separation column for chloric acid analysis
Guard column	228-38983-92	Shim-pack IC-SA2(G)	4.6 mm I.D. × 10 mm L.			9 μm	Guard column for Shim-pack IC-SA2
	228-41600-92	Shim-pack IC-SA3(G)	4.6 mm I.D. × 10 mm L.			5 μm	Guard column for Shim-pack IC-SA3

ICDS, LabSolutions and Shim-pack are trademarks of Shimadzu Corporation.



Shimadzu Corporation

[www.shimadzu.com/an/](http://www.shimadzu.com/an/)

**For Research Use Only. Not for use in diagnostic procedures.**

This publication may contain references to products that are not available in your country. Please contact us to check the availability of these products in your country.

Company names, products/service names and logos used in this publication are trademarks and trade names of Shimadzu Corporation, its subsidiaries or its affiliates, whether or not they are used with trademark symbol "TM" or "®".

Third-party trademarks and trade names may be used in this publication to refer to either the entities or their products/services, whether or not they are used with trademark symbol "TM" or "®".

Shimadzu disclaims any proprietary interest in trademarks and trade names other than its own.

The contents of this publication are provided to you "as is" without warranty of any kind, and are subject to change without notice. Shimadzu does not assume any responsibility or liability for any damage, whether direct or indirect, relating to the use of this publication.