

Columns for Ion Chromatography (Anion Analysis)

Features

- NI-424** • Columns for anion analysis with non-suppressor method
- I-524A** • NI-424 supports simultaneous analysis of fluoride and phosphate ions

- SI-90 4E** • Columns for anion analysis with suppressor method
- SI-50 4E** • Suitable for the quantitative analysis of fluoride ion
- SI-50 separates target inorganic anions from organic acids
- Not interfered by the system peak derived from carbonate

- SI-35 4D** • Columns for the analysis of oxyhalides with suppressor method
- SI-52 4E** • SI-35 supports rapid analysis of oxyhalides and general inorganic ions
- SI-52 supports simultaneous analysis of oxyhalides and general inorganic ions

Standard columns

● For anions (non-suppressor method)

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995243	IC NI-424	≥ 5,000	Quaternary ammonium	5	4.6 × 100	8mM 4-Hydroxybenzoic acid + 2.8mM Bis-Tris + 2mM Phenylboronic acid + 0.005mM CyDTA aq.
F6709616	IC NI-G	(guard column)	Quaternary ammonium	5	4.6 × 10	8mM 4-Hydroxybenzoic acid + 2.8mM Bis-Tris + 2mM Phenylboronic acid + 0.005mM CyDTA aq.
F6995240	IC I-524A	≥ 2,000	Quaternary ammonium	12	4.6 × 100	2.5mM Phthalic acid aq.
F6700400	IC IA-G	(guard column)	Quaternary ammonium	12	4.6 × 10	2.5mM Phthalic acid aq.

Base Material : Polyhydroxymethacrylate
Housing Material : SUS

● For anions (suppressor method)

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995244	IC SI-90 4E	≥ 5,000	Quaternary ammonium	9	4.0 × 250	1.8mM Na ₂ CO ₃ + 1.7mM NaHCO ₃ aq.
F6709620	IC SI-90G	(guard column)	Quaternary ammonium	9	4.6 × 10	1.8mM Na ₂ CO ₃ + 1.7mM NaHCO ₃ aq.
F6995245	IC SI-50 4E	≥ 10,000	Quaternary ammonium	5	4.0 × 250	3.2mM Na ₂ CO ₃ + 1.0mM NaHCO ₃ aq.
F6709625	IC SI-50G	(guard column)	Quaternary ammonium	5	4.6 × 10	3.2mM Na ₂ CO ₃ + 1.0mM NaHCO ₃ aq.

Base Material : Polyvinyl alcohol
Housing Material : PEEK

● For oxyhalides (suppressor method)

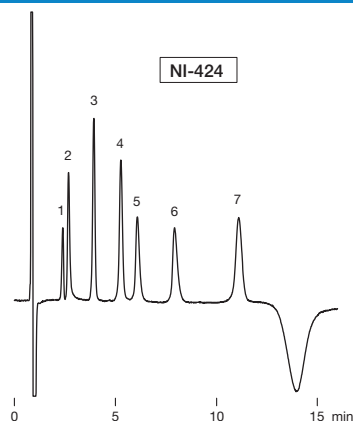
Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995290	IC SI-35 4D	≥ 13,000	Quaternary ammonium	3.5	4.0 × 150	3.6mM Na ₂ CO ₃ aq.
F6709627	IC SI-95G	(guard column)	Quaternary ammonium	9	4.6 × 10	3.6mM Na ₂ CO ₃ aq.
F6995260	IC SI-52 4E	≥ 14,000	Quaternary ammonium	5	4.0 × 250	3.6mM Na ₂ CO ₃ aq.
F6709626	IC SI-92G	(guard column)	Quaternary ammonium	9	4.6 × 10	3.6mM Na ₂ CO ₃ aq.

Base Material : Polyvinyl alcohol
Housing Material : PEEK

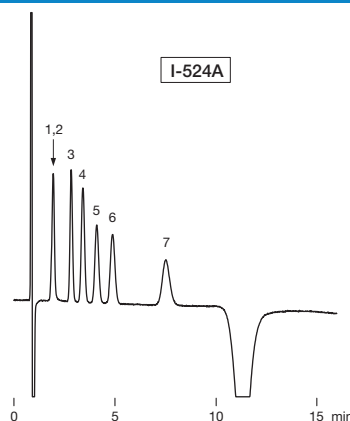
Line filters for IC

Product Code	Product Name	Contents
F8500630	IC FL-1	One holder and one filter
F8500640	IC FL-1 filter	5 filters

Anions analysis with non-suppressor method (NI-424 and I-524A)



Sample : 20 μ L
 1. H₂PO₄⁻ 10mg/L
 2. F⁻ 1mg/L
 3. Cl⁻ 1mg/L
 4. NO₂⁻ 5mg/L
 5. Br⁻ 5mg/L
 6. NO₃⁻ 5mg/L
 7. SO₄²⁻ 5mg/L



NI-424 is a high performance type of column offers an increased theoretical plate number twice as much as I-524A.

[Features of NI-424]

- (1) Enables the separation of H₂PO₄⁻ and F⁻ which were difficult to separate with I-524A.
- (2) The shape of each peak is sharper, and the separation balance is proper. Especially, the separation of Cl⁻ and NO₂⁻ is improved.

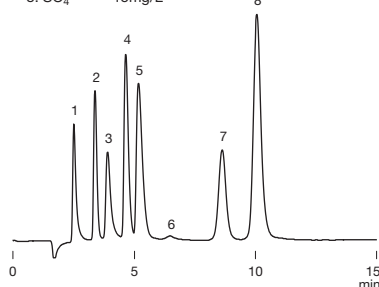
Column : Shodex IC NI-424
Eluent : 8mM 4-Hydroxybenzoic acid + 2.8mM Bis-Tris + 2mM Phenylboronic acid + 0.005mM *CyDTA aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

Column : Shodex IC I-524A
Eluent : 2.5mM Phthalic acid + 2.3mM Tris(hydroxymethyl)aminomethane aq.
Flow rate : 1.2mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

*CyDTA : trans-1,2-Diaminocyclohexane-N,N,N',N'-tetra acetic acid

Anions analysis using SI-90 4E (suppressor method)

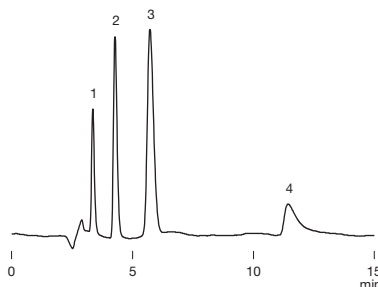
Sample : 20 μ L
 1. F⁻ 2mg/L
 2. Cl⁻ 3mg/L
 3. NO₂⁻ 5mg/L
 4. Br⁻ 10mg/L
 5. NO₃⁻ 10mg/L
 6. HCO₃⁻ 300mg/L
 7. PO₄³⁻ 15mg/L
 8. SO₄²⁻ 15mg/L



Column : Shodex IC SI-90 4E
Eluent : 1.8mM Na₂CO₃ + 1.7mM NaHCO₃ aq.
Flow rate : 1.5mL/min
Detector : Suppressed conductivity
Column temp. : Room temp. (25°C)

Perchloric acid analysis using SI-90 4E (suppressor method)

Sample : 100 μ L
 1. Cl⁻ 3mg/L
 2. NO₃⁻ 10mg/L
 3. SO₄²⁻ 15mg/L
 4. ClO₄⁻ 10mg/L

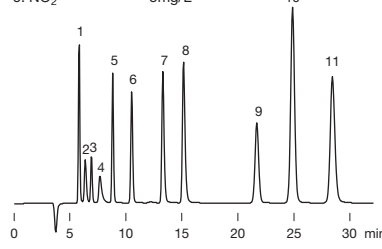


Column : Shodex IC SI-90 4E
Eluent : 6mM Na₂CO₃ aq. + 10% CH₃CN
Flow rate : 1.0mL/min
Detector : Suppressed conductivity
Column temp. : 25°C

Anions analysis using SI-50 4E (suppressor method)

SI-50 4E is a high performance type of SI-90 4E. Acetic acid, formic acid, and methacrylic acid eluted between F⁻ and Cl⁻. The carbonate system peak appears between NO₂⁻ and Br⁻ peaks.

Sample : 20 μ L
 1. F⁻ 2mg/L
 2. Acetic acid 10mg/L
 3. Formic acid 2mg/L
 4. Methacrylic acid 10mg/L
 5. Cl⁻ 3mg/L
 6. NO₂⁻ 5mg/L
 7. Br⁻ 10mg/L
 8. NO₃⁻ 10mg/L
 9. PO₄³⁻ 15mg/L
 10. SO₄²⁻ 15mg/L
 11. Oxalic acid 15mg/L



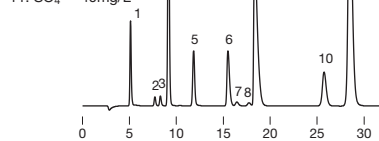
Column : Shodex IC SI-50 4E
Eluent : 3.2mM Na₂CO₃ + 1.0mM NaHCO₃ aq.
Flow rate : 0.7mL/min
Detector : Suppressed conductivity
Column temp. : 25°C

Oxyhalides and anions analysis using SI-52 4E (suppressor method)

SI-52 4E is a high resolution column offering 14,000 or higher theoretical plate number. It supports simultaneous analysis of oxyhalides and inorganic anions. The recommended analysis temperature is 45°C.

Sample : 50 μ L

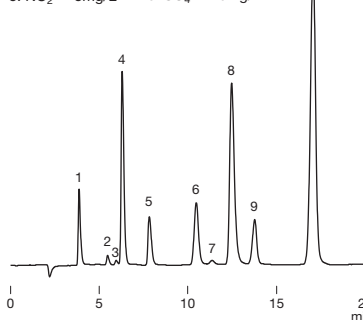
1. F⁻ 2mg/L
 2. ClO₂⁻ 1mg/L
 3. BrO₃⁻ 1mg/L
 4. Cl⁻ 10mg/L
 5. NO₂⁻ 5mg/L
 6. Br⁻ 10mg/L
 7. ClO₃⁻ 1mg/L
 8. Dichloroacetic acid 1mg/L
 9. NO₃⁻ 30mg/L
 10. PO₄³⁻ 15mg/L
 11. SO₄²⁻ 40mg/L



Column : Shodex IC SI-52 4E
Eluent : 3.6mM Na₂CO₃ aq.
Flow rate : 0.8mL/min
Detector : Suppressed conductivity
Column temp. : 45°C

Oxyhalides and anions analysis using SI-35 4D (suppressor method)

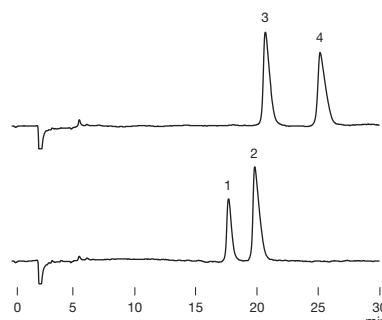
Sample : 20 μ L
 1. F⁻ 2mg/L
 2. ClO₂⁻ 1mg/L
 3. BrO₃⁻ 1mg/L
 4. Cl⁻ 10mg/L
 5. NO₂⁻ 5mg/L
 6. Br⁻ 10mg/L
 7. ClO₃⁻ 1mg/L
 8. NO₃⁻ 30mg/L
 9. PO₄³⁻ 15mg/L
 10. SO₄²⁻ 40mg/L



Column : Shodex IC SI-35 4D
Eluent : 2.0mM Na₂CO₃ + 4.5mM NaHCO₃ aq.
Flow rate : 0.6mL/min
Detector : Suppressed conductivity
Column temp. : 45°C

Tricarboxylic acid (suppressor method)

Sample : 20 μ L
 1. Citric acid 10mg/L
 2. Isocitric acid 50mg/L
 3. trans-Aconitic acid 20mg/L
 4. cis-Aconitic acid 20mg/L



Column : Shodex IC SI-35 4D
Eluent : 9.0mM Na₂CO₃ aq.
Flow rate : 0.6mL/min
Detector : Suppressed conductivity
Column temp. : 45°C

Columns for Ion Chromatography (Cation Analysis)

Features

- YS-50**
- High performance type of YK-421
 - Applicable to both suppressor and non-suppressor methods
 - Peak shape is sharper, especially for divalent cation analysis
 - Supports the analysis of alkylamines and transition metals
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- YK-421**
- Column for cation analysis with non-suppressor method
 - Simultaneous analysis of monovalent and divalent cations
 - Suitable for separation of alkylamines
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- Y-521**
- Column for cation analysis with non-suppressor method
 - For the separation of monovalent or divalent cations
 - Corresponds to USP L17 and L22
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- T-521**
- Column for transition metal ion analysis
 - Highly sensitive analysis is achieved by post column color reaction method

Standard columns

● For cations

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Base Material	Particle Size (μm)	Column Size (mm) I.D. x Length	Shipping Solvent
F7122000	IC YS-50	≥ 5,500	Carboxyl	Polyvinyl alcohol	5	4.6 x 125	H ₂ O
F6700530	IC YS-G	(guard column)	Carboxyl	Polyvinyl alcohol	5	4.6 x 10	H ₂ O
F7120012	IC YK-421	≥ 2,800	Carboxyl	Silica	5	4.6 x 125	5mM Tartaric acid + 1mM Dipicolinic acid + 1.5g/L Boric acid aq.
F6709608	IC YK-G	(guard column)	Carboxyl	Silica	5	4.6 x 10	5mM Tartaric acid + 1mM Dipicolinic acid + 1.5g/L Boric acid aq.
F6995210	IC Y-521	≥ 3,000	Sulfo	Styrene divinylbenzene copolymer	12	4.6 x 150	4mM HNO ₃ aq.
F6700230	IC Y-G	(guard column)	Sulfo	Styrene divinylbenzene copolymer	12	4.6 x 10	4mM HNO ₃ aq.

Housing Material : SUS

● For transition metal ions

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (μm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995250	IC T-521	≥ 3,000	Sulfo	12	4.6 x 150	3mM HNO ₃ aq.
F6700412	IC T-G	(guard column)	Sulfo	12	4.6 x 10	3mM HNO ₃ aq.

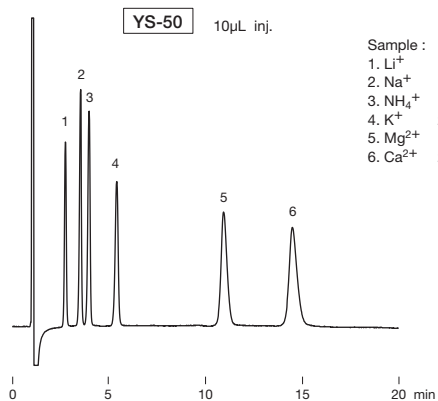
Base Material : Styrene divinylbenzene copolymer

Housing Material : PEEK

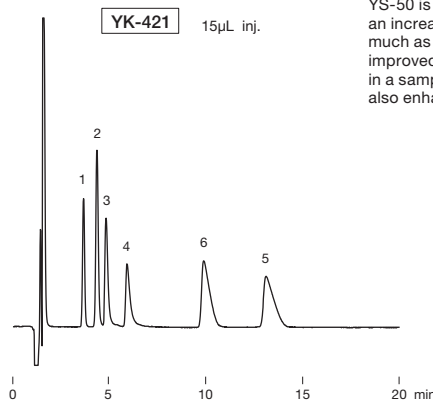
Line filters for IC

Product Code	Product Name	Contents
F8500630	IC FL-1	One holder and one filter
F8500640	IC FL-1 filter	5 filters

Standard cations (YS-50 and YK-421)



Sample :
 1. Li⁺ 2mg/L
 2. Na⁺ 10mg/L
 3. NH₄⁺ 10mg/L
 4. K⁺ 20mg/L
 5. Mg²⁺ 10mg/L
 6. Ca²⁺ 20mg/L



YS-50 is a high performance type of column offers an increased theoretical plate number twice as much as YK-421. In particular, the peak shape is improved. The quantitative performance for NH₄⁺ in a sample containing high concentration Na⁺ is also enhanced.

Resolution (Na ⁺ and NH ₄ ⁺)	YS-50	YK-421
	2.5	2.1

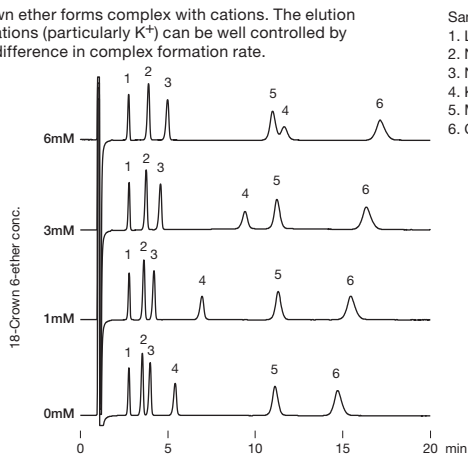
TP	YS-50	YK-421
Mg ²⁺	6,900	3,000
Ca ²⁺	6,600	3,000

Column : Shodex IC YS-50
Eluent : 4mM Methanesulfonic acid aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

Column : Shodex IC YK-421
Eluent : 5mM Tartaric acid + 1mM Dipicolinic acid + 1.5g/L Boric acid aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

Effects of crown ether in eluent

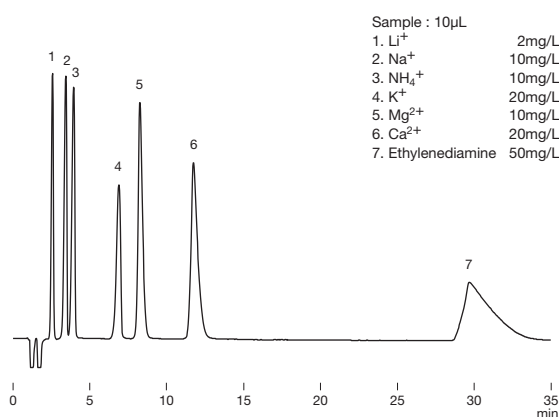
Crown ether forms complex with cations. The elution of cations (particularly K⁺) can be well controlled by the difference in complex formation rate.



Sample : 10µL
 1. Li⁺ 2mg/L
 2. Na⁺ 10mg/L
 3. NH₄⁺ 10mg/L
 4. K⁺ 20mg/L
 5. Mg²⁺ 10mg/L
 6. Ca²⁺ 20mg/L

Column : Shodex IC YS-50
Eluent : 4mM Methanesulfonic acid + 18-Crown 6-ether aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

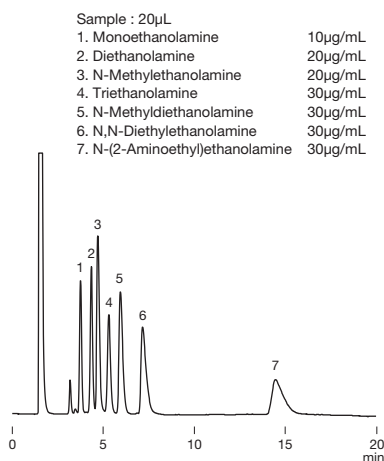
Simultaneous analysis for cations and ethylenediamine



Sample : 10µL
 1. Li⁺ 2mg/L
 2. Na⁺ 10mg/L
 3. NH₄⁺ 10mg/L
 4. K⁺ 20mg/L
 5. Mg²⁺ 10mg/L
 6. Ca²⁺ 20mg/L
 7. Ethylenediamine 50mg/L

Column : Shodex IC YS-50
Eluent : 4mM Nitric acid + 1.5mM 18-Crown 6-ether aq. /CH₃CN=90/10
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

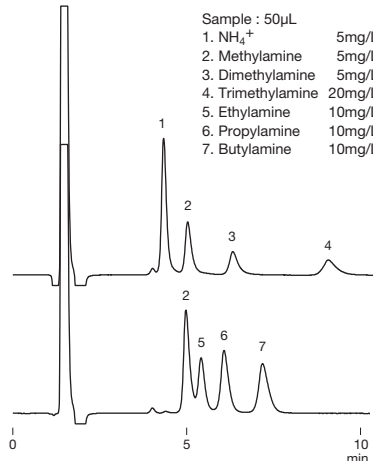
Amino alcohols



Sample : 20µL
 1. Monoethanolamine 10µg/mL
 2. Diethanolamine 20µg/mL
 3. N-Methylethanolamine 20µg/mL
 4. Triethanolamine 30µg/mL
 5. N-Methyldiethanolamine 30µg/mL
 6. N,N-Diethylethanolamine 30µg/mL
 7. N-(2-Aminoethyl)ethanolamine 30µg/mL

Column : Shodex IC YK-421
Eluent : 4mM Nitric acid aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C

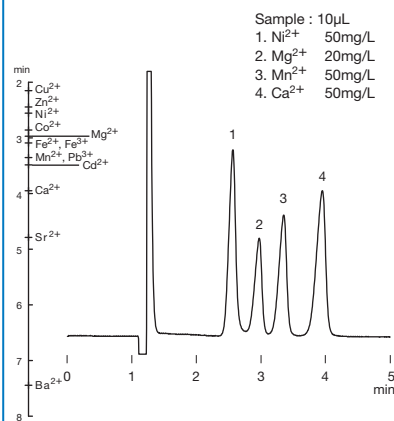
Alkylamines



Sample : 50µL
 1. NH₄⁺ 5mg/L
 2. Methylamine 5mg/L
 3. Dimethylamine 5mg/L
 4. Trimethylamine 20mg/L
 5. Ethylamine 10mg/L
 6. Propylamine 10mg/L
 7. Butylamine 10mg/L

Column : Shodex IC YK-421
Eluent : 4mM H₃PO₄ aq./CH₃CN=90/10
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 25°C

Alkaline earth metal ions



Sample : 10µL
 1. Ni²⁺ 50mg/L
 2. Mg²⁺ 20mg/L
 3. Mn²⁺ 50mg/L
 4. Ca²⁺ 50mg/L

Column : Shodex IC Y-521
Eluent : 4mM Tartaric acid + 2mM Ethylenediamine aq.
Flow rate : 1.0mL/min
Detector : Non-suppressed conductivity
Column temp. : 40°C