Thermo Scientific Dionex Inuvion ion chromatography system

Keywords

Ion chromatography, Inuvion, advanced, intuitive, simplified operation, smart, time saving, high-performance, consistency, improved reproducibility, function-driven, space-saving design

Introduction

The Thermo Scientific™ Dionex™ Inuvion™ ion chromatography system makes ion analysis simpler and more intuitive than ever before while delivering consistently excellent results. Thermo Scientific™ Reagent-Free Ion Chromatography (RFIC™) saves time, simplifies operation, and ensures greater day-to-day consistency, while providing an additional option for method optimization using gradient separations enabled by eluent generation.

Ultra reliable day-to-day performance

- Advanced, high-performance pump technology and electronics
- Inert, non-metallic PEEK components throughout the system ensure compatibility with corrosive eluents and provide metal-contamination-free chromatography
- Built-in diagnostics that automatically detect any hardware and consumables issues
- A thermostatted, high-performance conductivity detector that minimizes lab temperature-related variability, enabling highly reproducible conductivity measurements
- Electronically actuated six-port Rheodyne™ PEEK injection valve for precise sampling
- A built-in vacuum degasser provides in-line degassing of eluents, ensuring reproducibility and protection of eluents from contamination and decomposition
- With an extended digital operating range up to 18,000 µS and intelligent autoranging, the detector captures major and trace constituents simultaneously, delivering confident results across a wide concentration range in one injection—single-range analog signal output is also included
- Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) control includes automated configuration and setup wizards along with an electronic logbook to monitor nearly unlimited user selectable operational parameters
- Optional column heater provides day-to-day consistency, ensuring reproducibility and stability—eluent preheating prior to the column maintains the column temperature set by the analyst

Simple, intuitive user experience

- Space-saving design preserves valuable bench space
- Smart, function-driven design allows quick access to everything on the instrument
- RFIC electrolytically regenerated suppression increases the simplicity of ion chromatography by removing the need for regenerant chemicals, additional regenerant pumps, or regenerant pump maintenance
- RFIC eluent generation electrolytically generates high-purity eluents online to ensure consistent performance day-to-day, lab-to-lab, and operator-to-operator—with eluent generation, gradient separations can be as easy as isocratic applications
- When paired with an autosampler, automated sample preparation capabilities enable techniques such as online filtration, concentration, and matrix elimination
- An optional automatic eluent monitor helps operators ensure there is sufficient eluent for the analyses scheduled to be run, optimizing system uptime and throughput
- Smart startup, standby, and shutdown routines ensure the system is quickly ready for the day's work without user intervention
- Streamlined e-panel quickly shows status during runs
- Clear, descriptive error codes enable faster problem resolution and first-time fixes
- Built-in how-to videos reduce training time and simplify setup and operation

Easily configurable and upgradeable

- Versatile, adaptable platform allows you to configure the system with a range of user-installable accessories to meet both current and future needs
- Upgrading to RFIC with eluent generation expands IC capabilities, enabling easy and cost-effective adaptation to changing sample types and workflow requirements

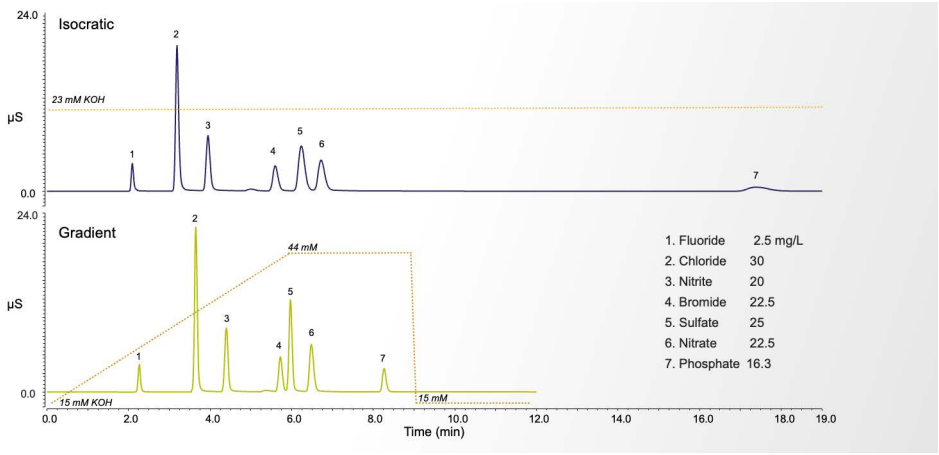

Figure 1.
Comparison of an isocratic method versus an eluent gradient method of an anion standard. The gradient method produces sharper peak shapes while reducing the overall run time by half. The Dionex Inuvion IC system can produce eluent gradients without the need for two separate eluents or a proportioning pump.

Dionex Inuvion IC system specifications

Specification	Performance and features
Analytical pump and fluidics	
Type	Serial dual-reciprocating pistons, microprocessor-controlled constant stroke, variable speed
Construction	Chemically inert, metal-free PEEK pump heads and flow paths compatible with aqueous eluents of pH 0–14 and reversed-phase solvents
Pump operating pressure	0–35 MPa (0–5,000 psi)
Flow rate range	0.00–5.00 mL/min in 0.01 mL/min increments
Flow precision	<0.1%, typically
Flow accuracy	<0.1%, typically, at 13.8 MPa (2,000 psi) and 1.0 mL/min
Pressure ripple	<1%
Eluent on-off valve	Standard
Leak sensor	Optical, standard
Piston seal wash (optional)	Pump head wash can be operated in continuous or intermittent mode when connected to rinse solution supply
Pressure alarm limits	Upper and lower limit pressure alarms can be set
Vacuum degas	Standard, user adjustable vacuum level

Dionex Inuvion IC system specifications *(continued)*

Specification	Performance and features
Analytical pump and fluidics *(continued)*	
Eluent bottles	Standard 2 L polypropylene bottle provided; optional 4 L polypropylene bottle available
Eluent monitoring	Optional eluent monitor for 2 L and 4 L bottles
Eluent bottle pressure regulator (optional)	Digitally controlled regulator with display; pressure range 0–15 psi, maximum inlet pressure 100 psi
Injection valve	6-port, 2-position Rheodyne valve, electronically activated
Columns supported	2, 3, 4, and 5 mm ID; maximum length 250 mm analytical column with 50 mm guard column
RFIC eluent generator	
Eluent types	KOH, MSA, or K_2CO_3
Eluent concentration range	0.1–100 mM (up to 15 mM for K_2CO_3)
Flow rates	0.10–3.00 mL/min when a Thermo Scientific™ Dionex™ EGC Eluent Generator Cartridge is installed
Maximum operating pressure	Dionex EGC cartridges: 35 MPa (5,000 psi)
Gradient profiles	Up to 9 time-defined gradient steps
Column heater (optional)	
Operating temperature range	10 to 60 °C (50 to 140 °F); settable within the software; minimum working range is 5 °C above ambient temperature
Temperature accuracy	±0.5 °C at sensor, at calibration points (35, 45 °C)
Suppressors and control	
Non-suppressed chromatography	Yes, supported
Supported suppression modes	• Chemical suppression • Electrolytic suppression
Available suppressor types	• 2 mm and 4 mm anion and cation
Note: Please refer to the **Thermo Scientific™ Dionex™ eluent suppressors product specifications sheet** for the latest information on available suppressors and detailed specifications.	
Suppressor regeneration	• Chemical suppressor: Internal or external regenerant pump • Electrolytic suppressor: Recycled or external water mode
Suppressor wear parts	• Chemical suppression: Regenerant pump tubing • Electrolytic suppression: No user-replaceable parts
Electrolytic salt converter	• Thermo Scientific™ Dionex™ SC-CERS 500 available in 2- and 4-mm versions
Carbonic acid removal for anions	• Thermo Scientific™ Dionex™ CRD 200 Carbonate Removal Device for use with hydroxide eluents • Thermo Scientific™ Dionex™ CRD 300 Carbonate Removal Device for use with carbonate eluents
Conductivity detector electronics and flow cell	
Type	Microprocessor-controlled digital signal processor
Cell drive	128 kHz square wave
Linearity	$r^2 \geq 0.999\%$
Resolution	0.002 nS/cm
Full-scale output ranges	Digital signal range 0–18,000 µS/cm, with auto-ranging; analog signal range 0–18,000 µS/cm
Noise, wet	≤ 0.2 nS at 23 µS/cm background ≤ 0.1 nS at 1 µS/cm background
Temperature compensation	Variable, default set at 1.7%/°C at cell temperature
Temperature range	Ambient +7 °C, 15 to 60 °C
Cell electrodes	Passivated 316 stainless steel; compatible with methanesulfonic acid
Cell body	Chemically inert polymeric material

Dionex Inuvion IC system specifications *(continued)*

Specification	Performance and features
Conductivity detector electronics and flow cell *(continued)*	
Cell volume	<1 µL
Heat exchanger	Inert, tortuous path for low axial dispersion
Maximum cell operating pressure	10 MPa (1,500 psi)
Data filter	Rise times from 0 to 10 s, Data Collection Rate 1 to 100 Hz, user selectable
Autosampler	
Automation using autosampler	Thermo Scientific™ Dionex™ AS-DV, AS-AP, AS-HV, or third-party autosamplers
Sequential/simultaneous injection	Yes, depending on autosampler capabilities
Automated dilution	Yes, available with Dionex AS-AP autosampler
Dilution factor, Dionex AS-AP autosampler	1:1 to 1:1,000
Dilution time, Dionex AS-AP autosampler	15 s with sample overlap
Inline sample degassing	Yes, optional with Dionex CRD 200 or 300 carbonate removal device
Inline filtration	Yes, Dionex AS-DV autosampler or inline filter
High automation flexibility	Conditionals using Chromeleon CDS and post-run features
Software	
Chromeleon CDS is supported on the following operating systems: • Windows™ 10 Enterprise and Pro • Windows™ 11 Enterprise and Pro	• Autoconfiguration • Automated procedure wizards • System wellness and predictive performance • Data trending plots (numerical device parameters) • Virtual column simulator (evaluation mode standard, isocratic and gradient optional) • Multi-vendor automation support of proprietary and 3rd party instruments (fully controls over 550 modules from more than 25 manufacturers, including GC, CE, HPLC, and MS) • Customizable system control panels • System status virtual channels • System trigger commands and conditionals • Data audit trail, system audit trail and instrument audit trail • Multiple network control and network failure protection (optional) • System calibration storage (factory, present, and previous; completely user selectable) • Customized reporting (unlimited report workbooks) • Automated system qualification (detailed, comprehensive qualification reports) • Dual sequence view in the studio
Physical specifications	
Power requirements	100–240 V AC, 50–60 Hz autoranging
Operating temperature	4–40 °C (40–104 °F)
Operating humidity range	20–80% relative, non-condensing
Control modes	Full control through Chromeleon CDS; alternative control through TTL or relay closures; one relay output, two TTL outputs, two assignable TTL inputs
USB communication protocol	One USB input; three USB outputs
Product dimensions (h × w × d)	66.1 x 29.2 x 43.2 cm (26.0 x 11.5 x 17.0 in.)
Weight	16.2 kg (36 lb)

Ordering information

Description	Part No.
Thermo Scientific™ Dionex™ Inuvion™ IC System	22185-60104 or 22185-60118, depending on order location
Thermo Scientific™ Dionex™ Inuvion™ IC System with RFIC	22185-60108 or 22185-60120, depending on order location
Optional accessories	
Column heater	22185-62400
Integrated regenerant pump	22185-62702
Digital gas pressure regulator	22185-62706
6-port auxiliary valve	22185-62704
10-port auxiliary valve	22185-62703
Seal wash pump	22185-62701
Thermo Scientific™ Dionex™ IC PEEK Viper™ fitting kit	B51000232
3-port low pressure valve	B51001290
Thermo Scientific™ Dionex™ Eluent Monitor	2 L: 22185-62707 4 L: 22185-62708

Learn more at **thermofisher.com/inuvion**