



# 1290

Agilent 1290 Infinity II LC

TS 5.; 5.1 Agilent 1290 Infinity II ultraefektyviosios skysčių chromatografijos sistema

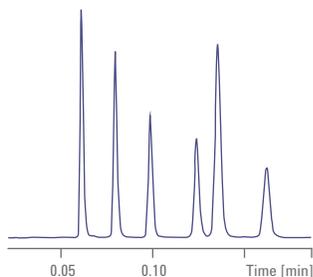
**SET NEW BENCHMARKS IN EFFICIENCY –  
WITH THE NEXT GENERATION OF UHPLC**



**Agilent Technologies**

## NEW BENCHMARKS IN EFFICIENCY

The Agilent 1290 Infinity II LC embodies the next generation of UHPLC – with the exceptional reliability and robustness you expect from Agilent, plus breakthrough technologies to maximize the efficiency of your business in three dimensions.



### MAXIMIZE ANALYTICAL EFFICIENCY

Unmatched separation and detection performance deliver analysis data of the highest quality – for ultimate confidence in your results.



### MAXIMIZE INSTRUMENT EFFICIENCY

Highest sample capacity and fastest injection cycles combine with new levels of usability – for highest throughput for any application.



### MAXIMIZE LABORATORY EFFICIENCY

Seamless integration in current infrastructure and smooth method transfer from legacy equipment – for non-disruptive transition to highest productivity and lowest cost of ownership.

# AGILENT INFINITYLAB – A PERFECT MATCH

The Agilent InfinityLab family of instruments, columns and supplies are matched to work seamlessly together, alongside Agilent OpenLAB software and Agilent CrossLab services, to provide highest efficiency in laboratory workflows. Agilent InfinityLab columns and supplies provide the links to the Agilent InfinityLab LC Series to optimize performance for highest efficiency and laboratory safety.



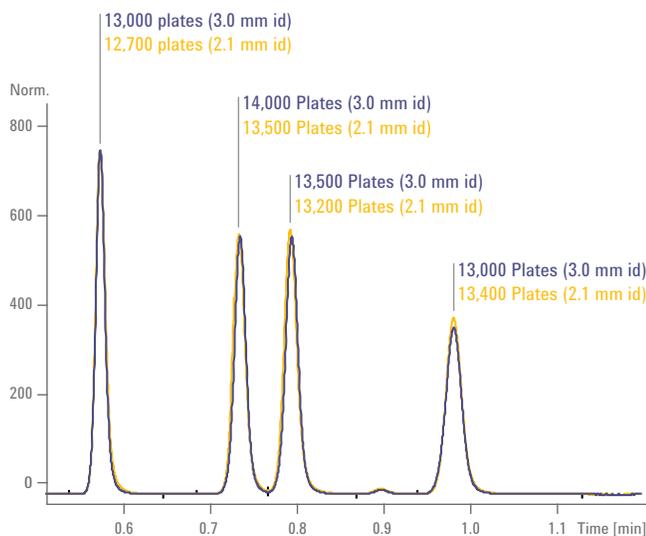
MAXIMUM ANALYTICAL EFFICIENCY

## EXPERIENCE UNMATCHED PERFORMANCE FOR ULTIMATE CONFIDENCE IN YOUR RESULTS

The 1290 Infinity II LC achieves unmatched separation and detection performance, delivering data of the highest quality – for ultimate confidence in your results, and in your business decisions.

### Lowest dispersion for highest resolution

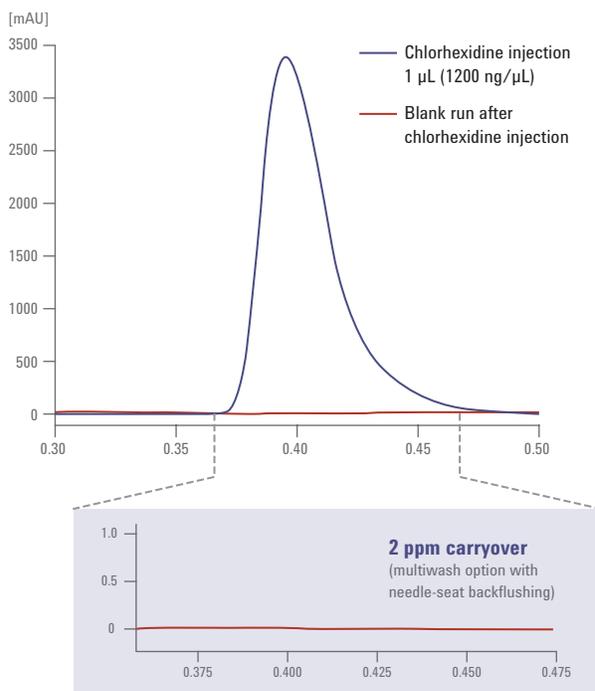
The entire flow path of the 1290 Infinity II LC is optimized for lowest extra-column band broadening. Specially designed components such as needle seats, heat exchangers, column fittings and flow cells allow you to fully exploit the power range of 1300 bar at 2 mL/min. Data rates up to 240 Hz deliver uncompromised chromatographic resolution – even for your fastest separations.



Thanks to lowest extra-column volume the 1290 Infinity II LC achieves highest chromatographic efficiency in terms of plate numbers for both 2.1 mm and larger inside diameter columns.

### Lowest carryover for highest data quality

The 1290 Infinity II Multisampler reduces carryover to less than 9 ppm. Using the multiwash feature you can flush the inside and outside surfaces of the injection needle with up to three different solvents, as well as backflush the needle seat.



Even with problematic samples the 1290 Infinity II Multisampler can keep carryover down to less than 9 ppm.

## Exceptional efficiency: InfinityLab Poroshell 120 Columns

Achieve high-resolution, high-efficiency separations at pressures up to 1300 bar with InfinityLab Poroshell 120 columns. 12 bonded phases and three particle diameters (4.0, 2.7 and 1.9  $\mu\text{m}$ ) are available for flexible development and straightforward transfer of methods. Manageable pressure and long column lifetime allow you to get the most from your InfinityLab LC. Permanently fitted column ID tags track column usage, adding confidence and security to your analysis.



InfinityLab Poroshell 120 columns with ID tags are recognized automatically by the 1290 Infinity II LC and add traceability to your results by providing at-a-glance detail about the last injection date, number of injections, and the maximum temperature used.

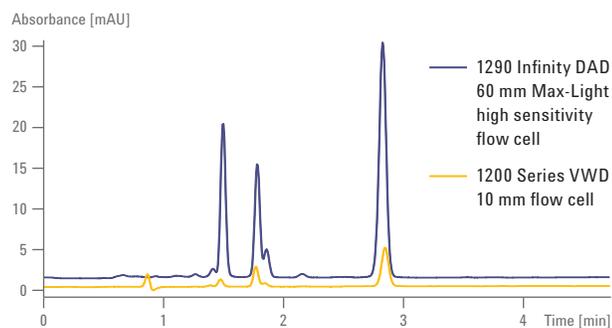
## Unique detection capabilities reveal more

The 60 mm path length of the Agilent Max-Light flow cell enables the 1290 Infinity II Diode Array Detector to achieve typical noise levels of less than  $\pm 0.6 \mu\text{AU}/\text{cm}$  for highest detection sensitivity and lowest detection limits.

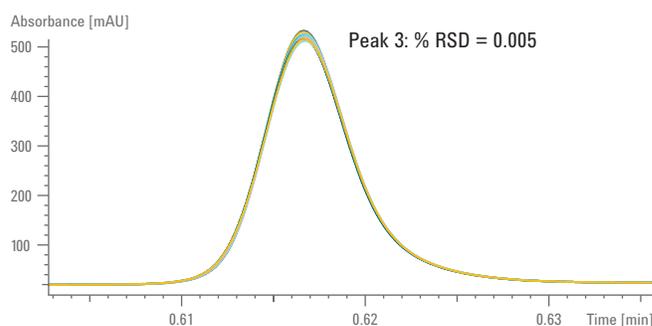
The 1290 Infinity II Evaporative Light Scattering Detector is the only detector of its kind that provides a 90x wider dynamic range. Further, this ELSD facilitates subambient operation for unrivalled detection of thermally-labile analytes.

## Highest retention time precision for reliable peak identification

The 1290 Infinity II High Speed Pump and the 1290 Infinity II Flexible Pump deliver unmatched flow and composition precision for reproducible and robust results. The 1290 Infinity II Flexible Pump is the only low-pressure mixing pump that combines the ultimate performance of a high-pressure mixing UHPLC pump with the flexibility of a quaternary pump. This pump delivers superior gradient performance over the entire composition range from 1 to 99 %.



The 1290 Infinity II DAD achieves 10x higher sensitivity than earlier 1200 Series diode array or variable wavelength detectors.



This overlay of 10 chromatograms shows superior retention time precision of the 1290 Infinity II High Speed Pump of 0.005 %RSD, even for ultrafast separations.

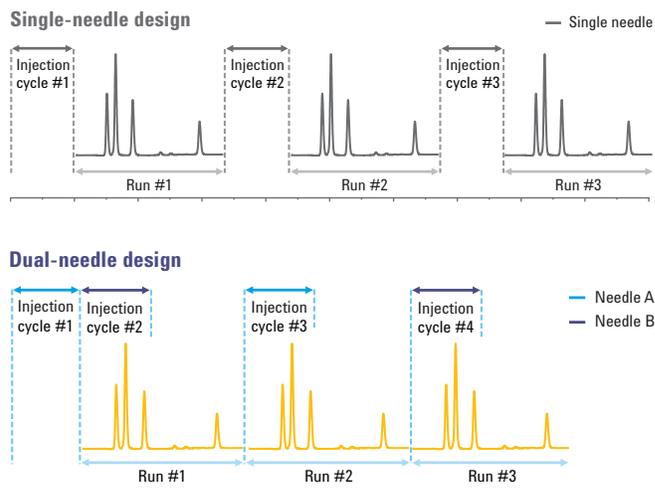
MAXIMUM INSTRUMENT EFFICIENCY

## EXPERIENCE UNLIMITED CAPACITY AND FASTEST TURNAROUND FOR HIGHEST THROUGHPUT

The 1290 Infinity II LC provides the capacity and speed you require to get your work done as effectively and efficiently as possible. Highest sample capacity and fastest injection cycles combine with new levels of usability – for highest throughput for any application.

### High capacity and fast injection cycles

Within the footprint of an Agilent LC stack, the 1290 Infinity II Multisampler takes a maximum load of 16 microtiter plates for a total capacity of 6144 samples, or up to 432 vials. For temperature-sensitive or thermally-labile samples, a highly efficient and integrated cooling system is optionally available. The 1290 Infinity II LC allows you to run extremely fast UHPLC separations, so that the total run time is determined by the duration of the injection cycle and not the separation itself! With a second injection needle in the 1290 Infinity II Multisampler, you can reduce cycle times to mere seconds – virtually eliminating wait times!



The dual-needle design of the 1290 Infinity II Multisampler eliminates wait times by overlapping injection cycles without compromising data quality by carryover or sample discrimination.

### Efficient control, acquisition and reporting

Agilent OpenLAB CDS software gives you the most comprehensive and fully traceable management of your 1290 Infinity II LC, including instrument control, result generation, data management and advanced reporting. Visualize data trends quickly, capture outliers, retention time shifts, or integration problems efficiently. Built-in calculations provide results directly in data analysis – no need to generate a full report, no errors caused by data export or manual transcription. Confirmation and documentation of audit-trail reviews in electronic records make it an easy task to comply with the latest FDA regulatory requirements.

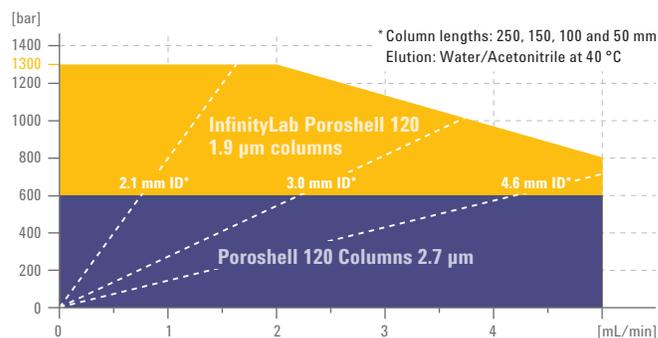


Peak Explorer helps you uncover and resolve problems faster. Find anomalies at a glance – even among hundreds of chromatograms and peaks.

## Flexibility for all applications

The 1290 Infinity II LC gives you the full flexibility you need for any analytical task.

- Wide power range for optimum use of most analytical columns independent of inside diameter or particle technology
- Wide column temperature range from 20 degrees below ambient to 110 °C to tune selectivity or speed
- Intelligent System Emulation technology to run legacy methods – even from other vendors LCs
- Dual-needle injection for automated scalable injection volumes from less than 1 µL up to 900 µL



The power range of the 1290 Infinity II LC gives you the flexibility to meet virtually any separation challenge.

## A new level of usability

With the 1290 Infinity II LC, running a UHPLC system has never been so easy.

- Revolutionary InfinityLab Quick Connect UHPLC column fittings for easy-to-use, accurate and robust zero-dead-volume connections
- Multicolumn thermostat with simplified access and space for up to 8 columns
- Easy-to-install InfinityLab Quick Connect heat exchangers with volumes of 1.0, 1.6 or 3.0 µL



InfinityLab Quick Connect fittings and Quick Connect heat exchangers are easy to install.

## More automation capabilities

The 1290 Infinity II LC is packed with productivity tools – helping your lab to be more efficient.

- BlendAssist software for convenient, accurate and precise additive or buffer blending
- Injector programming for simple sample preparation steps such as dilution, mixing or derivatization
- InfinityLab Quick Change valves for column and solvent selection, column regeneration, or sample clean-up and enrichment



InfinityLab Quick Change valves allow you to automate a wide variety of applications – the valves' unique design gives you the flexibility to choose switching configurations that match your lab's individual requirements.

MAXIMUM LABORATORY EFFICIENCY

# DRIVE NON-DISRUPTIVE TRANSITION TO HIGHER PRODUCTIVITY AND LOWER COSTS

The 1290 Infinity II LC integrates seamlessly in your laboratory's current infrastructure and facilitates smooth method transfer from legacy equipment – for non-disruptive transition to highest productivity and lowest cost of ownership.

## Transfer methods seamlessly between LCs, regardless of brand

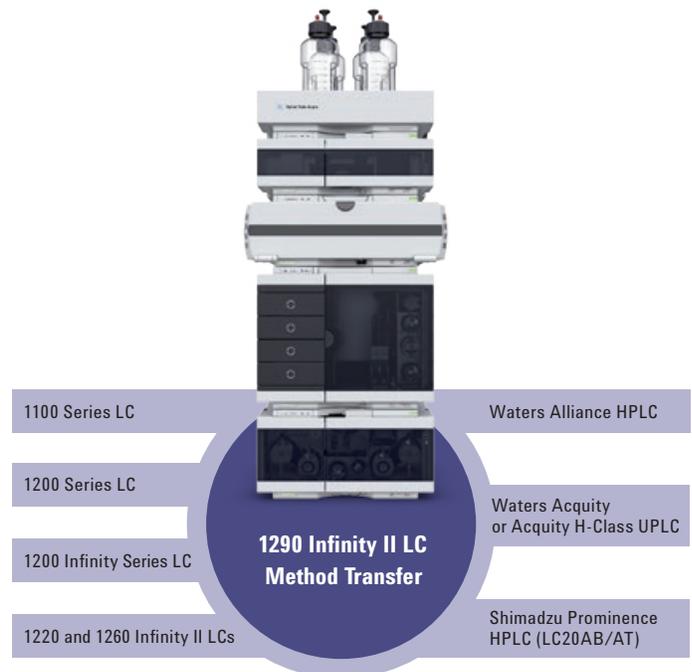
With Intelligent System Emulation technology (ISET) from Agilent you can execute any legacy HPLC or latest UHPLC method while delivering the same chromatographic results – all through a few mouse clicks. ISET eliminates deviations in resolution and retention times when your laboratory deploys methods developed originally on other HPLC or UHPLC systems.

## Minimize your instrument-related costs

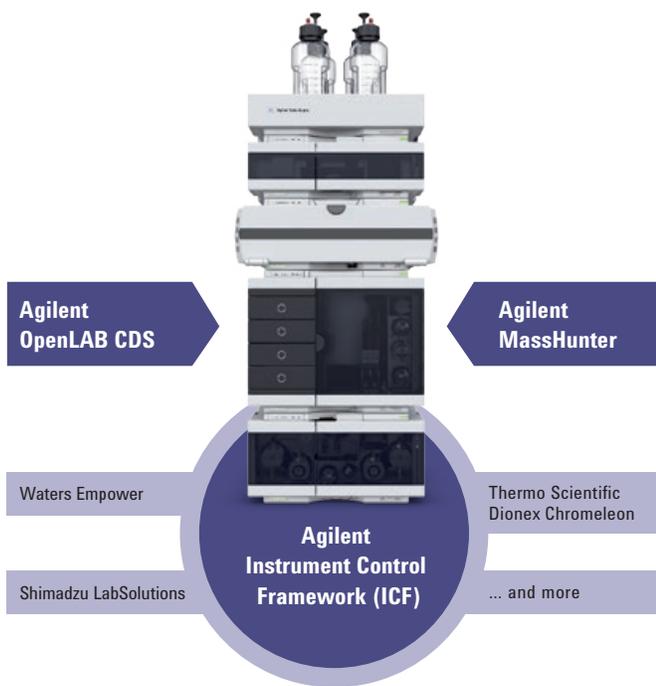
Run your legacy methods with ISET while taking full advantage of the UHPLC speed, resolution and sensitivity of the 1290 Infinity II LC. You no longer need to maintain your old legacy LC systems!

## Achieve higher productivity for method development

Speed up your method development with UHPLC performance and then fine-tune your method by emulating the target system – and be confident that the method will run as intended.



With Intelligent System Emulation Technology you can run legacy methods while taking full advantage of the UHPLC speed, resolution and sensitivity of the 1290 Infinity II LC.



The 1290 Infinity II LC runs best when controlled through OpenLAB CDS or MassHunter software. Agilent ICF technology gives third-party CDS providers an easy route to support the 1290 Infinity II LC.

## Take control of your chromatography

Agilent OpenLAB CDS is the perfect companion for your 1290 Infinity II LC and 6100 Series Single Quadrupole LC/MS. For more demanding LC/MS applications, Agilent MassHunter gives you combined control of your Agilent LC and Triple Quadrupole or Quadrupole Time-of-Flight LC/MS, as well as powerful tools for comprehensive data analysis.

With a strong commitment to open systems, Agilent offers Instrument Control Framework (ICF), a free-of-charge software component that makes it faster and easier for third-party providers to enable and control Agilent LCs through their CDS or workstations. Integrate a new 1290 Infinity II LC in your current CDS, seamlessly and with access to most of the advanced capabilities and features.

	GOLD	SILVER	BRONZE
<b>Services Included in All Agilent CrossLab Service Agreements</b>			
Contract-level Preferred Response vs. T&M	✓	✓	✓
Hardware Telephone Support	✓	✓	✓
<b>Onsite Repair Services</b>			
Unlimited Onsite Repair Visits (travel & labor)	✓	✓	✓
Parts Required for Repair	✓	✓	✓
Consumables/Supplies Required for Repair, including liners, seals, tubing, assemblies, and multipliers	✓	✓	✓
<b>Advanced Diagnostics and Reporting</b>			
Agilent Remote Advisor-Assist	✓	✓	✓
Agilent Remote Advisor-Report	✓	✓	✓
Agilent Remote Advisor-Alert	✓	✓	
<b>High-Availability Services</b>			
Extended Coverage Hours Discount	✓		

Agilent CrossLab service plans let you choose the service level that best meets your needs, goals and budget. Regional differences to service plans may apply. Additional options are available.

## Get the most from your investment

If you are ready for a true technology refresh of the instrumentation and software in your lab, Agilent CrossLab provides transition services to enable rapid and seamless shift to the latest technology. Leave it to the experts to provide a speedy, stepwise upgrade that matches your needs and budget with minimal disruption to your workflows.

Agilent also offers comprehensive instrument and enterprise services as well as a full curriculum of Agilent University learning solutions to maximize uptime, simplify administration and protect the investments in your laboratory. Through preventive maintenance, our service plans protect your laboratory against the unknown, for dependable efficiency, fewer workflow disruptions, and optimized laboratory productivity. All service plans include Agilent Remote Advisor, a powerful set of proactive, real-time support and reporting features, delivered by knowledgeable Agilent experts.

## EXPERIENCE THE ULTIMATE IN EFFICIENCY WITH TAILORED LC AND LC/MS SOLUTIONS

### Automated method development

Accelerate your method development by combining superior hardware with dedicated software for smooth automation of LC and LC/MS method development.

- Access more than 1000 different sets of unique LC separation conditions from a choice of up to 26 solvents and 8 columns, and a selection of different temperature zones
- Set up new screening campaigns fast and easily with the Agilent Method Scouting Wizard
- Perform advanced automated method optimization with solutions from Agilent partners ACD/Labs, ChromSword, or S-Matrix



The InfinityLab Method Development Solution comes ready-to-run and is designed for automated access to more than 1000 sets of unique LC separation conditions.

### Analysis of trace-level impurities

With a 30x wider UV dynamic range, 30x higher UV sensitivity, UHPLC resolution and speed plus universal detection capabilities, the InfinityLab HDR-DAD Impurity Analyzer is an ideal solution for impurity analysis of formulations with widely different concentrations.

- Quantify the active ingredients as well as impurities in a single assay and thereby dramatically reduce sample turnaround times
- Achieve higher area precision and gain more confidence in automated peak integration
- Don't miss any compound through combination with other detection options such as the 1290 Infinity II ELSD with 90x wider dynamic range



The InfinityLab HDR-DAD Impurity Analyzer quantifies sample components with widely different concentrations in a single assay.

### Ultrahigh resolution for complex samples

Comprehensive 2D-LC provides the ultimate separation performance you need to analyze complex matrixes such as herbal extracts, food samples or polymer synthesis products. With the InfinityLab 2D-LC Solution you gain fast access to orthogonal data from heart-cutting, multiple heart-cutting, high-resolution sampling or comprehensive analyses. What's more, at the flip of a switch you can select between single-dimension UHPLC and the ultimate chromatographic power of 2D-LC, allowing you to match separation performance with sample complexity.



InfinityLab 2D-LC Solution – on one system you can perform single-dimension UHPLC as well as aspire to the ultimate chromatographic power of heart-cutting, multiple heart-cutting or comprehensive 2D-LC.

## High-throughput screening LC/MS solutions

The 6200 Series Accurate-Mass Time-of-Flight (TOF) LC/MS acquire data at 30 spectra per second to ensure excellent data quality for fast UHPLC. Agilent proprietary technologies in all system components combine synergistically for shortest analysis times and highest throughput.

- Dual-needle injection for ultrafast injection cycles down to 5 seconds
- High sample capacity of up to 6144 samples within footprint of Agilent LC stack
- Low pump delay volumes for fast gradients
- Quick-Change valve solution for alternating column regeneration



Agilent High-Throughput LC/MS solutions achieve highest analysis speeds and shortest cycle times without compromising robustness or data quality.

## High-sensitivity LC/MS solutions

The 6495 Triple Quadrupole LC/MS helps you achieve highest sensitivity. Agilent's iFunnel technology dramatically increases ion sampling and transmission, enabling the lowest limits of detection and quantification for your most demanding applications. Data quality can be improved further using the multi-wash capabilities of the 1290 Infinity II Multisampler for sample carryover of less than 9 ppm.



Agilent High-Sensitivity LC/MS solutions achieve lowest limits of detection and quantification.

## Untargeted analysis LC/MS solutions

Agilent LC/MS solutions for untargeted analysis allow you to screen and quantify hundreds of compounds in a single analysis. Your laboratory can focus on running samples rather than tedious method development. The 6500 Series Accurate-Mass Quadrupole Time-of-Flight (Q-TOF) LC/MS is the ideal choice for screening applications, delivering low femtogram-level sensitivity with high resolution and accurate mass. The 6560 Ion Mobility Q-TOF LC/MS adds an extra dimension of ion mobility separation, revealing a greater detail from complex samples.



Agilent LC/MS solutions for untargeted analysis feature reduced system dispersion for highest chromatographic resolution and sensitivity.

Learn more

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## Agilent 1290 Infinity II Flexible Pump (G7104A)

### Physical Specifications

**Table 1 Physical Specifications G7104A**

Type	Specification	Comments
Weight	16.1 kg (35.5 lbs)	
Dimensions (height × width × depth)	180 x 396 x 436 mm (7.1 x 15.6 x 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	120 VA / 110 W	
Ambient operating temperature	4 – 55 °C (39 – 131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.
ISM Classification	ISM Group 1 Class B	According to CISPR 11

## Performance Specifications

Table 2 Performance Specifications G7104A

Type	Specification	Comments
Hydraulic system	Dual pistons in series pump with proprietary servo-controlled variable stroke design and smooth motion control for active damping.	
Pump resolution step size	300 pL	
<u>Flow range</u>	<u>Settable: 0.001 – 5 mL/min</u>	<u>In 0.001 mL/min increments</u>
<u>Flow precision</u>	<u>≤0.07 % RSD or 0.01 min SD, whichever is greater</u>	
<u>Flow accuracy</u>	<u>±1 % or ±10 µL/min, whichever is greater</u>	Pumping degassed H <sub>2</sub> O
<u>Pressure operating range</u>	<u>up to 130 MPa (1300 bar, 18855 psi) up to 2 mL/min</u> <u>Ramping down to 80 MPa (800 bar, 11603 psi) at 5 mL/min</u>	
Pressure pulsation	<1 % amplitude or <0.5 MPa (5 bar), whichever is greater	
Compressibility compensation	Automatic	When using "Solvent Types" in method
Recommended pH-range	1.0 – 12.5,	Solvents with pH <2.3 should not contain acids which attack stainless steel.
<u>Gradient formation</u>	<u>Low pressure quaternary mixing/gradient capability using proprietary high-speed proportioning valve</u>	
Delay volume	≤350 µL (default configuration)	Measured with water at 1 mL/min (water/water with tracer)
Composition range	Settable: 0 – 100 % Recommended: 1 – 99 %	
<u>Composition precision</u>	<u>&lt;0.15 % RSD or 0.02 min SD, whichever is greater</u>	

TS 5.2.5 srauto intervalas 0,001-5 mL/min su nustatymo žingsniu 0,001 mL/min

TS 5.2.8 srauto preciziškumas 0,07% RSD

TS 5.2.7 srauto tikslumas 1%

TS 5.2.4; 5.2.5 maksimalus palaikomas slėgis 1300 bar esant srautui iki 2 mL/min ir 800 bar esant srautui iki 5 mL/min

TS 5.2.1; 5.2.2 žemo slėgio ketunaris (maišymas iki keturių eliuentų vienu metu) gradiento formavimo režimas

TS 5.2.6 srauto sudėties preciziškumas 0,15% RSD

## Pumps

### Agilent 1290 Infinity II Flexible Pump (G7104A)

**Table 2 Performance Specifications G7104A**

Type	Specification	Comments
Composition accuracy	±0.4 % absolute	At 1 mL/min for water/water with tracer
<u>Number of solvent</u>	<u>4</u>	
<u>Solvent selection valve</u>	<u>Internal 4-solvent gradient formation valve included.</u> <u>External 2x 12 solvent valve as option, fully integrated in the pump control interface.</u>	<b>TS 5.2.3 Eliuentų tiekimo sistema gali naudoti papildomą vožtuvą, kuris leidžia pasirinkti 12 skirtingų eliuentų.</b>
<u>Integrated degassing unit</u>	<u>Number of channels: 4</u> <u>Internal volume per channel: 1.5 mL</u>	
Materials in contact with solvent	TFE/PDD copolymer, FEP, PEEK, PPS, stainless steel, polyimide, ceramic, HMWPE	
Automatic purge valve	Enables automatic software-embedded functionalities such as switching the optional mixer in and out or automatic purging.	
<u>Active Seal wash</u>	<u>Included</u>	
Intelligent System Emulation Technology (ISET)	Included	
Instrument control	LC & CE Drivers A.02.11 or above Instrument Control Framework (ICF) A.02.03 or above InfinityLab LC Companion (G7108AA) with firmware D.07.25 or above Instant Pilot (G4208A) with firmware B.02.17 or above Lab Advisor software B.02.06 or above	For details about supported software versions refer to the compatibility matrix of your version of the LC & CE Drivers.
Communication	Controller Area Network (CAN), LAN, RS232C, APG remote: ready, start, stop, and shutdown signals	

TS 5.2.1 integruotas eliuentų maišymo vožtuvas, leidžiantis pasirinkti iki keturių eliuentų vienu metu

TS 5.2.11 integruotas nudujinimo modulis. Nudujinami 4 eliuento kanalai

TS 5.2.9 pilnai integruotas aktyvus stūmoklių apiplovimas

## Pumps

### Agilent 1290 Infinity II Flexible Pump (G7104A)

**Table 2 Performance Specifications G7104A**

Type	Specification	Comments
Safety features and maintenance	<p><u>Leak detection, safe leak handling, leak output signal for shutdown of the pumping system.</u> No hazardous voltages in major maintenance areas.</p> <p>Extensive diagnostics, error detection and display with Agilent Lab Advisor software.</p>	TS 5.11.1 Modulyje integruoti nuotėkio davikliai
GLP features	<p>Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of seal wear and volume of pumped mobile phase with pre-defined and user settable limits and feedback messages.</p> <p>Electronic records of maintenance and errors.</p>	
Housing	All materials are recyclable.	

TS 5.4 Agilent 1290 Infinity II  
kolonėlių termostatas su  
šaldymo funkcija

## Agilent 1290 Infinity II Multicolumn Thermostat (G7116B)

### Physical Specifications

Table 93 Physical Specifications G7116B

Type	Specification	Comments
Weight	12.5 kg (27.6 lbs)	
Dimensions (height × width × depth)	160 x 435 x 436 mm (6.3 x 17.1 x 17.2 inches), Width 472 mm with column ID option Width with column identification kit: 472 mm	G7116B may have a Column ID tag reader on both sides.
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	150 VA, 150 W	
Ambient operating temperature	4–55 °C (39–131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.
ISM Classification	ISM Group 1 Class B	According to CISPR 11

## Performance Specifications

**Table 94 Agilent 1290 Infinity II Multicolumn Thermostat (G7116B) Performance Specifications**

Feature	Specification
Operating principle	Dual, independent Peltier-element thermostatted column compartment. Solvent pre-heating and still-air operation for reduction of chromatographic band-broadening under UHPLC-conditions. Up to three devices can be clustered and controlled by a single user interface for additional flexibility <sup>1</sup> .
<u>Temperature range</u>	<u>4 °C to 110 °C</u> , (minimum 20 °C below ambient)
<u>Temperature stability</u>	<u>±0.03 °C</u>
<u>Temperature accuracy</u>	<u>±0.5 °C</u> (with calibration)
<u>Temperature precision</u>	<u>0.05 °C</u>
<u>Independent Temperature zones</u>	<u>2</u> (in single device) up to 6 in clustered configuration <sup>1</sup>
<u>Column capacity</u>	<u>8 columns of 100 mm length plus Quick-Connect fittings or pre-columns</u> <u>4 columns of 300 mm length plus Quick-Connect fittings or pre-columns</u> <u>Selection of columns by single optional integrated 8-column selection valve (1300 bar)</u> Maximum of 24 columns of 100 mm length plus Quick-Connect fittings or pre-columns 12 columns of 300 mm length plus Quick-Connect fittings or pre-columns with clustering <sup>1</sup> of three devices.
<u>Heat-up/cool-down time</u>	<u>5 min from ambient to 40 °C</u> 10 min from 40 °C to 20 °C <30 min from 25 °C to 100 °C
Solvent heat exchangers	Individually quick-installable for every column. Available at 1 µL delay volume, 0.075 mm i.d. capillary (ultra-low dispersion), 1.6 µL delay volume, 0.12 mm i.d. capillary (standard) and 3 µL delay volume, 0.12 mm i.d. capillary (high-flow) volume.
<u>Valve options</u>	<u>1x integrated valve drive as option</u> 2x external valve drives as option <u>to host user-exchangeable Quick-Change valve heads of different formats, materials and pressure ratings (up to 1300 bar):</u> 2-position/6-port, 2-position/10-port, 6-column selection (6-pos/14-port), <u>8-column selection (8-pos/18-port)</u> . Equipped with tags, valve heads are automatically identified by SW

TS 5.4.4 temperatūros stabilumas  
0,03 °C

TS 5.4.3 temperatūros tikslumas  
0,5 °C

TS 5.4.2 temperatūros  
preciziškumas  
0,05 °C

TS 5.4.6 Yra galimybė talpinti 4  
kolonėles, kurių ilgis 30 cm, su  
prieškolonėmis arba 8 kolonėles,  
kurių ilgis 10 cm, su  
prieškolonėmis įvairiomis  
kombinacijomis.

TS 5.4.5 Termostato kaitimo greitis 5  
min kaistant nuo aplinkos  
temperatūros iki 40°C.

TS 5.4.8 kolonėlių termostate  
integruojami ir valdomi skirtingo  
formato vožtuvai, įskaitant 18  
kanalų/8 pozicijų vožtuvą 8  
kolonėlių parinkimui, kuris palaiko  
slėgį iki 1300 bar

TS 5.4.1 Termostato  
temperatūros intervalas nuo 4°C  
iki 110°C

TS 5.4.7 dvi nepriklausomos  
temperatūros zonos tame pačiame  
kolonėlių termostate

Table 94 Agilent 1290 Infinity II Multicolumn Thermostat (G7116B) Performance Specifications

Feature	Specification
Instrument Control	Lab Advisor B.02.06 or above LC and CE Drivers A.02.11 or above For details about supported software versions refer to the compatibility matrix of your version of the LC and CE Drivers
Local Control	Agilent Instant Pilot (G4208A) B.02.19 or above
Communications	Controller-area network (CAN).
Safety and maintenance	Extensive diagnostics, error detection and display (through Instant Pilot control module and Agilent LabAdvisor), <u>leak detection, safe leak handling, leak output signal for shutdown of pumping system</u> . Low voltages in main maintenance areas. Door-open sensor.
GLP	Valve heads carrying tags with serial number, pressure rating, number of switches and valve type.

<sup>1</sup> Requires LC and CE drivers A.02.12 or above

TS 5.11.1 Modulyje integruoti nuotėkio davikliai

## NOTE

All specifications are valid for distilled water at ambient temperature (25 °C), set point at 40 °C and a stable flow range from 0.2 – 5 mL/min. Equilibration Time: 10 min.

TS 5.3 Agilent 1290  
Infinity II Vialsampler  
automatinis mėginių  
injektorius

## Agilent 1290 Infinity II Vialsampler (G7129B)

### Physical Specifications

Table 35 Physical Specifications G7129B

Type	Specification	Comments
Weight	19 kg (41.9 lbs)	w/o sample thermostat
Dimensions (height × width × depth)	320 x 396 x 468 mm (12.8 x 15.6 x 18.4 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	350 VA, 350 W, 1195 BTU/h	
Ambient operating temperature	4 - 40 °C (39 - 104 °F), without sample thermostat up to 55 °C (131 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F) <sup>1</sup>	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.
ISM Classification	ISM Group 1 Class B	According to CISPR 11
Permitted solvents	Boiling point ≥56 °C (133 °F). Auto-ignition temperature ≥200 °C (394 °F).	

<sup>1</sup> If a sample thermostat is included the upper value for humidity can be reduced. Please check your lab conditions to stay beyond dew point values for non-condensing operation.

## Performance Specifications

**Table 36 Performance Specifications G7129B**

Type	Specification	Comments
TS 5.3.2 injekcijos tūrio intervalas nuo 0,1 - 100 µL	<u>Injection range</u> 0.1 – 20 µL in 0.1 µL increments (default) 0.1 – 40 µL in 0.1 µL increments (if 40 µL loop is installed) 0.1 – 120 µL in 0.1 µL increments with 1290 Infinity large volume injection kit (hardware modification required) <u>0.1 – 100 µL in 0.1 µL (if 100 µL loop and 100 µL head is installed)</u>	Up to 1500 µL (with 1400 µL multi-draw kit and 100 µL analytical head)  up to 130 MPa (1300 bar, 18854 psi)  up to 60 MPa (600 bar, 8702 psi)
TS 5.3.3 injekcijos preciziškumas 0,25% RSD	<u>Injection precision</u> <0.25 % RSD of peak areas from <u>5 µL to 100 µL</u>	Measured caffeine
TS 5.3.1 automatinis mėginių injektorius palaiko 1300 bar slėgį	<u>Pressure range</u> <u>Up to 130 MPa (1300 bar, 18854 psi)</u>	
	Sample viscosity range 0.2 – 5.0 cP	
TS 5.3.7 132 pozicijos 2 ml chromatografiniams buteliukams	<u>Sample capacity</u> <u>132 x 2 mL vial</u> (two trays default) 100 x 2 mL vial (two classic trays optional) 36 x 6 mL vials (two trays optional)	
TS 5.3.5 injekcijos pernaša 0,004%	<u>Carryover</u> <0.004 % (40 ppm) with needle wash	
TS 5.3.6 injekcijos ciklo laikas 18 s	<u>Injection cycle time</u> <u>18 s</u> for draw speed 200 µL/min Ejection speed: 200 µL/min Injection volume: 1 µL	
TS 5.3.4 Automatinis mėginių injektorius geba paimti 1 µl mėginio tūrį, kai visas mėginio tūris yra 10 µl.	<u>Minimum sample volume</u> 1 µL from 5 µL sample in 100 µL microvial, or <u>1 µL from 10 µL sample</u> in 300 µL microvial.	Needle height offset has to be adapted to ensure that needle doesn't touch vial bottom. Default needle height = 0 equates to 2 mm above the vial bottom.
	Instrument control LC & CE Drivers A.02.12 or above Instrument Control Framework (ICF) A.02.03 or above Instant Pilot (G4208A) with firmware B.02.19 or above Lab Advisor B.02.07 or above	For details about supported software versions refer to the compatibility matrix of your version of the LC & CE Drivers

## Injectors

### Agilent 1290 Infinity II Vialsampler (G7129B)

**Table 36 Performance Specifications G7129B**

Type	Specification	Comments
Communication	Controller Area Network (CAN), Local Area Network (LAN), ERI: ready, start, stop and shut-down signals	
<u>Maintenance and safety-related features</u>	Extensive diagnostics, error detec- tion and display with Agilent Lab Advisor software <u>Leak detection, safe leak handling, leak output signal for shutdown of pumping system,</u> and low voltages in major maintenance areas	TS 5.11.1 Modulyje integruoti nuotėkio davikliai
GLP features	Early maintenance feedback (EMF) for continuous tracking of instru- ment usage with user-settable limits and feedback messages. Electronic records of maintenance and errors.	
Housing	All materials recyclable.	

TS 5.3.8 Automatinio mėginių injektoriaus mėginių termostatas

## Specifications of the Sample Thermostat

The sample thermostat is designed as a combination of a heater and vapor-compression refrigeration system. It uses non-Freon refrigerant (isobutane). This material is harmless to the environment and does not affect the ozone layer and global warming but it is combustible. Please adhere to the warnings listed in the manual.

**Table 37 Physical Specifications of the Sample Thermostat**

Type	Specification	Comments
Weight	<6 kg (< 13.2 lbs)	
Dimensions (height x width x depth)	205 x 340 x 370 mm (8.1 x 13.4 x 14.6 inches)	
Refrigerant gas	R600a (0.030 kg)	Ozone depletion potential (ODP) =0 Global warming potential (GWP) =3
Supply voltage	24VDC	
Current	10 A max.	
Ambient operating temperature	4 – 40 °C (39 – 104 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only
ISM Classification	ISM Group 1 Class B	According to CISPR 11

Table 38 Performance Specifications for the Sample Thermostat

Type	Specifications
Operating principle	High performance, low-energy consumption micro-compressor based cooler with natural R600a coolant (Butane 30 g), user-upgradable
<u>Temperature range</u>	<u>from 4 – 40 °C</u>
<u>Temperature settable</u>	<u>from 4 – 40 °C in 1 ° increments</u>
<u>Temperature accuracy</u>	<u>2 °C to 6 °C at a setpoint of 4 °C</u> <u>(&lt;25 °C, &lt;50 % r.H.)</u>

TS 5.3.8 Mėginio temperatūros palaikymo intervalas nuo 4°C iki 40°C su nustatymo žingsniu 1°C.

TS 5.3.9 Tikslumas nuo 2°C iki 6°C nustačius 4°C temperatūrą.

#### NOTE

Minimum firmware revision for the sample thermostat is D.07.22.

Minimum LC driver revision for the sample thermostat is A.02.14.

TS 5.5 Agilent 1260  
Infinity II  
Fluorescencinis  
detektorius

## Agilent 1260 Infinity II Fluorescence Detector (G7121A)

### Physical Specifications

Table 85 Physical Specifications G7121A

Type	Specification	Comments
Weight	11.9 kg (26.2 lbs)	
Dimensions (height × width × depth)	140 x 396 x 436 mm (5.5 x 15.6 x 17.2 inches)	
Line voltage	100 – 240 V~, ± 10 %	Wide-ranging capability
Line frequency	50 or 60 Hz, ± 5 %	
Power consumption	70 VA, 60 W	
Ambient operating temperature	4-40 °C (39-104 °F)	
Ambient non-operating temperature	-40 – 70 °C (-40 – 158 °F)	
Humidity	< 95 % r.h. at 40 °C (104 °F)	Non-condensing
Operating altitude	Up to 3000 m (9842 ft)	
Safety standards: IEC, EN, CSA, UL	Installation category II, Pollution degree 2	For indoor use only.
ISM Classification	ISM Group 1 Class B	According to CISPR 11

## Performance Specifications

Table 86 Performance Specifications G7121A

Type	Specification	Comments
Detection type	One signal wavelength (excitation and emission)	Programmable single wavelength (excitation and emission) fluorescence detector
<u>Single wavelength operation</u>	<ul style="list-style-type: none"> <li><u>RAMAN (H<sub>2</sub>O) &gt; 500 (noise reference measured at signal)</u> Ex=350 nm, Em=397 nm, dark value 450 nm, standard flow cell</li> <li><u>RAMAN (H<sub>2</sub>O) &gt; 3000 (noise reference measured at dark value)</u> Ex=350 nm, Em=397 nm, dark value 450 nm, standard flow cell</li> </ul>	
<u>Light source</u>	Xenon Flash Lamp, normal mode 20 W, economy mode 5 W, lifetime 4000 h	
Pulse frequency	296 Hz for single signal mode 74 Hz for economy mode	
<u>Maximum data rate</u>	74 Hz	
<u>Excitation monochromator</u>	Range: <u>settable 200 nm - 1200 nm</u> and zero-order Bandwidth: 20 nm (fixed)	
<u>Emission monochromator</u>	Range: <u>settable 200 nm - 1200 nm</u> and zero-order Bandwidth: 20 nm (fixed)	
Reference system	in-line excitation measurement	
Timetable programming	Single signal wavelength, response time, PMT Gain, baseline behavior (append, free, zero)	
<u>Wavelength characteristic</u>	<u>Repeatability +/- 0.2 nm</u> <u>Accuracy +/- 3 nm setting</u>	
<u>Flow cells</u>	<u>Standard: 8 µL</u> volume and 20 bar (2 MPa) pressure maximum, fused silica block	
Analog outputs	Recorder/integrator: 100 mV or 1 V, output range > 100 LU, two outputs	100 LU is the recommended range

TS 5.5.3 Raman S/N>500 matuojant triukšmą ties signalo bangos ilgiu; Raman S/N>3000 matuojant triukšmą ties tamsinės vertės bangos ilgiu (450 nm).

TS 5.5.1 Ksenono lempa

TS 5.5.4 duomenų rinkimo greitis 74 Hz

TS 5.5.2 bangos ilgio diapazonas 200-1200 nm

TS 5.5.5; 5.5.6 bangos ilgio tikslumas 3 nm, pakartojamumas 0,2 nm

TS 5.5.7 srautinės kiuvetės tūris 8 µl.

## Special Detectors

### Agilent 1260 Infinity II Fluorescence Detector (G7121A)

**Table 86 Performance Specifications G7121A**

Type	Specification	Comments
Instrument Control	LC & CE Drivers A.02.14 or above Instrument Control Framework (ICF) A.02.03 or above InfinityLab LC Companion (G7108AA) with firmware D.07.25 or above Instant Pilot (G4208A) with firmware B.02.19 or above Lab Advisor software B.02.09 or above	For details about supported software versions refer to the compatibility matrix of your version of the LC and CE Drivers
Communications	Controller Area Network (CAN), USB, ERI: ready, start, stop and shut-down signals	
<u>Safety features and maintenance</u>	<u>Leak detection, safe leak handling, leak output signal for shutdown of the pumping system.</u> No hazardous voltages in major maintenance areas. Extensive diagnostics, error detection and display with Agilent Lab Advisor software.	
GLP features	Early maintenance feedback (EMF) for continuous tracking of instrument usage in terms of lamp burn time with pre-defined and user settable limits and feedback messages. Electronic records of maintenance and errors.	
Housing	All materials are recyclable.	

TS 5.11.1 Modulyje integruoti nuotėkio davikliai



Agilent InfinityLab LC Series  
1290 Infinity II Flexible Pumps

## User Manual



# In This Guide...

This manual covers:

- Agilent 1290 Infinity II Flexible Pump (G7104A)
- Agilent 1290 Infinity II Bio Flexible Pump (G7131A)

TS 5.2.; 5.2.10 Siame dokumente rašoma apie Agilent 1290 Infinity II Flexible pump eliuentų tiekimo sistemos savybes

## 1 Introduction

This chapter gives an introduction to the pump and an instrument overview.

## 2 Site Requirements and Specifications

This chapter provides information on environmental requirements, physical and performance specifications.

## 3 Using the Pump

This chapter explains the operational parameters of the Agilent 1290 Infinity II Flexible Pumps.

## 4 Preparing the Pump

This chapter provides information on how to set up the module for an analysis and explains the basic settings.

## 5 How to Optimize the Performance of Your Module

This chapter gives hints on how to optimize the performance or use additional devices.

## 6 Troubleshooting and Diagnostics

This chapter gives an overview about the troubleshooting and diagnostic features.

## 7 Error Information

This chapter describes the meaning of error messages, and provides information on probable causes and suggested actions on how to recover from error conditions.

## What Are Error Messages

TS 5.2.10 Klaidos pranešimai yra pateikiami programinėje įrangoje ir indikuojami užsidegant raudonai skysčių chromatografo modulių lemputei. Esant klaidos pranešimams, analizė ir sistemos darbas yra stabdomas ir pratęsimas tik po vartotojo įsikišimo.

Error messages are displayed in the user interface when an electronic, mechanical, or hydraulic (flow path) failure occurs which requires attention before the analysis can be continued (for example, repair, or exchange of consumables is necessary). In the event of such a failure, the red status indicator at the front of the module is switched on, and an entry is written into the module logbook.

If an error occurs outside a method run, other modules will not be informed about this error. If it occurs within a method run, all connected modules will get a notification, all LEDs get red and the run will be stopped. Depending on the module type, this stop is implemented differently. For example, for a pump the flow will be stopped for safety reasons. For a detector, the lamp will stay on in order to avoid equilibration time. Depending on the error type, the next run can only be started, if the error has been resolved, for example liquid from a leak has been dried. Errors for presumably single time events can be recovered by switching on the system in the user interface.

Special handling is done in case of a leak. As a leak is a potential safety issue and may have occurred at a different module from where it has been observed, a leak always causes a shutdown of all modules, even outside a method run.

In all cases, error propagation is done via the CAN bus or via an APG/ERI remote cable (see documentation for the APG/ERI interface).

## Target pressure not reached for quaternary pump degasser

### Error ID: 29221

The target pressure of the quaternary pump degasser has not been reached within the expected time.

- Parameter: Pressure in mbar

Probable cause	Suggested actions
1 Condensation in degasser chamber due to temperature fluctuation.	Equilibrate and restart module. Use Evacuation Mode if necessary.
2 Degasser is defect.	Please contact your Agilent service representative.

## Solvent counter exceeded limit

### Error ID: 29146

The counter for the solvent volume has exceeded the limit, which has been set in the user interface.

<u>Probable cause</u>	<u>Suggested actions</u>
<u>1 No solvent present.</u>	<u>Refill solvent bottle.</u>
<u>2 Inappropriate setting.</u>	<u>Check solvent counter setting in user interface.</u>

TS 5.2.10 Klaidos pranešimas, kai vieno iš eliuentų kiekis yra mažesnis nei programinėje įrangoje nustatyta riba.



# 1290 Infinity II Valve Drive and Valve Heads

Agilent InfinityLab LC Series

## User Manual



## Overview of the Valve Drive

The Agilent 1290 Infinity II Valve Drive (G1170A) is a part of the InfinityLab LC Series. This is a valve drive delivered without a specific valve head. To be used in a HPLC system it is required to add a valve head to this device. It is compatible with all currently available Agilent InfinityLab Quick Change Valves (see [Table 1](#) on page 13)

It includes the following features:

- Built-in power supply
- Leak handling with a leak pane and a leak sensor underneath the valve head
- User exchangeable valve heads (Agilent InfinityLab Quick Change Valves)
- Valve type and pressure detected by RFID tag
- Flexible mounting bracket, for left- or right-side mounting on LC stacks or at the Agilent Column Organizer (G1383A).

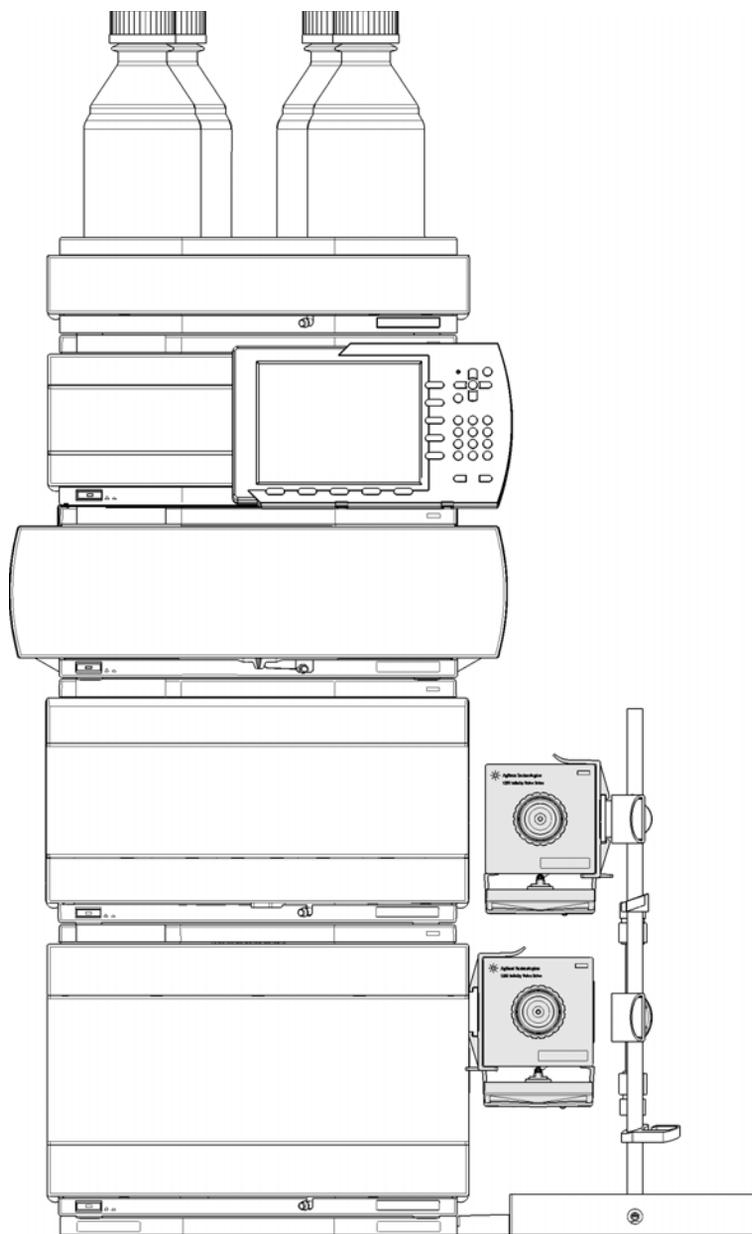


Figure 1 Mounting Examples for 1290 Infinity II Valve Drive

## Overview of the Valve Drive

Clamps (attachable to both sides)

Valve Drive

Status indicator

Changeable valve head

Leak sensor

Attachable leak plane

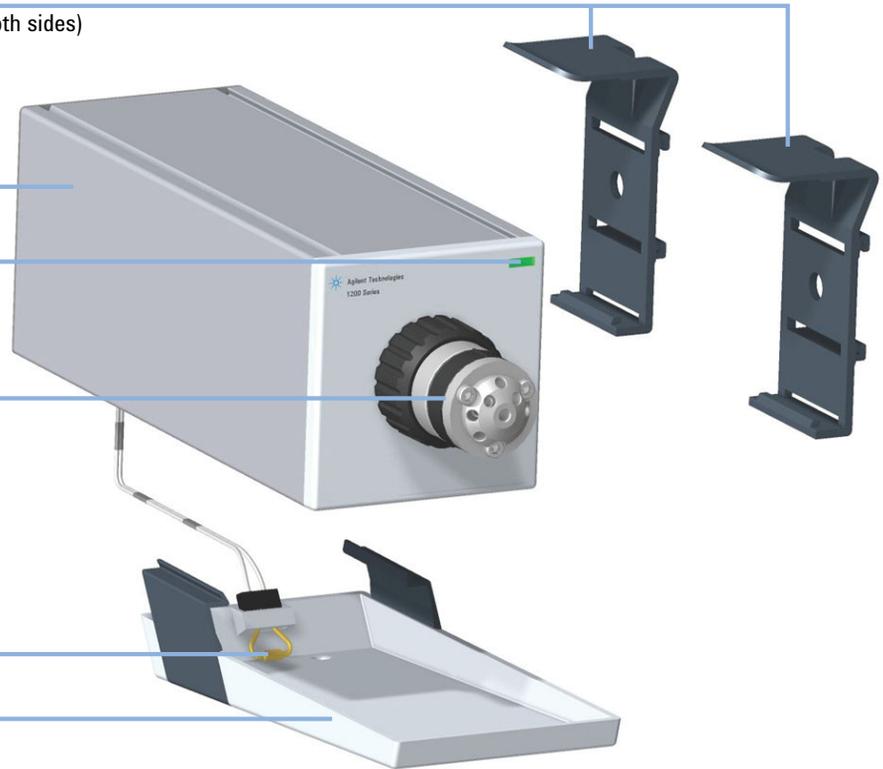


Figure 2 Overview of 1290 Infinity II Valve Drive

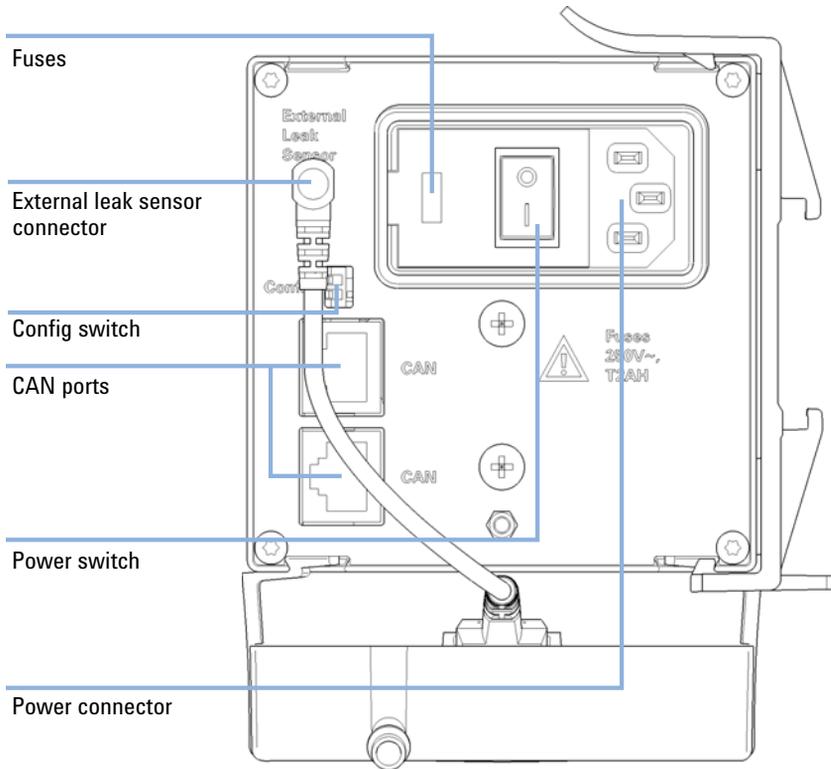


Figure 3 Rear View of 1290 Infinity II Valve Drive

# Overview of the Agilent InfinityLab Quick Change Valves

The Agilent InfinityLab Quick Change Valves can be installed in the Multicolumn Thermostat (G7116A/B), the 1290 Infinity Flexible Cube (G4227A) and in the 1290 Infinity II Valve Drive (G1170A).



For bio-inert modules use bio-inert parts only!



For 1290 Infinity II Bio LC modules, use bio / bio-compatible parts only.  
Do not mix parts between 1260 Infinity II Bio-Inert LC modules and 1290 Infinity II Bio LC modules.

**Table 1 Overview of the available Agilent Quick Change Valve Kits**

Valve Kit PN	Pressure [bar]	Positions	Ports	Typical Application
G4231A	800	2	6	<u>Any two-way switching, e.g. between two detectors, between waste and detector, between two columns</u>
<u>G4231C</u>	1300	2	6	
G4232C	800	2	10	Anything a 2-position/6-port valve can do plus alternating column regeneration.
G4232D	1300	2	10	
G4234A	800	6	14	6 column selection
G4234C	1300	6	14	

TS 5.5.8 vožtuvas, kuris leidžia pasirinkti tarp dviejų skirtingų detektorių

## Introduction to the Agilent 1290 Infinity II Valve Drive and InfinityLab LC Series Valves

### Overview of the Agilent InfinityLab Quick Change Valves

**Table 1** Overview of the available Agilent Quick Change Valve Kits

Valve Kit PN	Pressure [bar]	Positions	Ports	Typical Application
G4235A	210	12	13	Solvent selection or fractionation
G4237A	800	4	10	4 column selection
G4239C	1300	8	18	8 column selection
G5631A	600	2	6	Bio-inert, same as G4231A
G5632A	600	2	10	Bio-inert, anything a 2-position/6-port valve can do plus alternation column regeneration
G5639A	600	4	10	Bio-inert 4 column selection
G5641A	1300	2	10	Bio, anything a 2-position/6-port valve can do plus alternation column regeneration

## Typical Applications

Agilent InfinityLab Quick Change Valves support a variety of valve applications. They can be mounted to an external 1290 Infinity II Valve Drive (G1170A) or a Multicolumn Thermostat (G7116A/B).

Examples of typical applications are:

- Dual and multiple column selection
- Sample enrichment and sample cleanup
- Alternating column regeneration
- Solvent selection

## Dual and Multiple Column Selection

### Dual Column Selection

Advantages:

- Increase productivity
- Higher instrument up-time
- Faster method scouting

Quickly change between two different stationary phases to check your separation selectivity, or use two identical stationary phases to have the second column immediately available after the first one loses efficiency, for example with complex matrices.

## Multiple Column Selection

With the 6-column selection valve (G4234A/C) and the capillary kit for column selection you can set up your system for use with up to 6 columns as displayed in Figure 4 on page 16. Or you can use the system with 5 columns and one flow path for flushing the system. This setup allows you to switch between columns for faster method development. The multicolumn setup might also be used, if several operators are sharing the system.

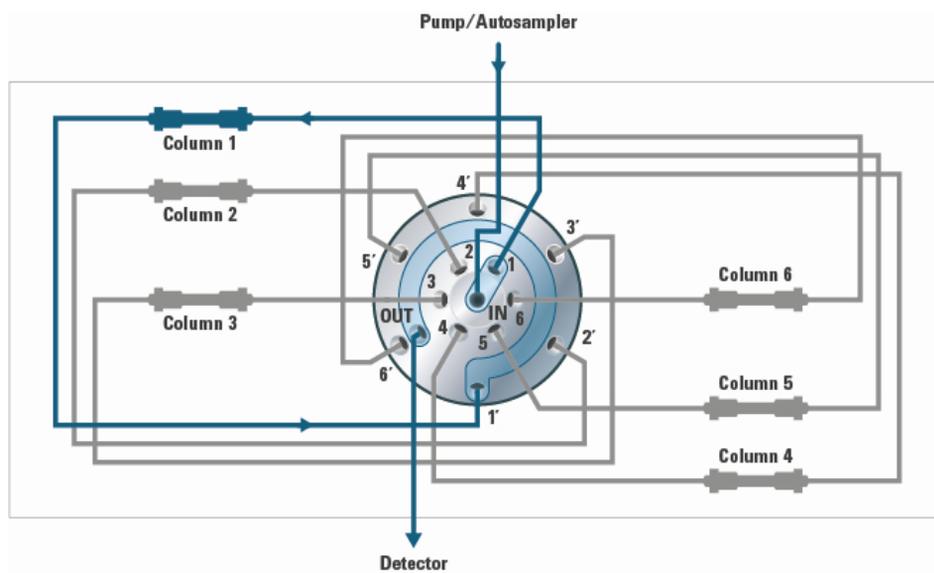


Figure 4 Multiple Column Selection (Example of Schematic Setup for 6-Column Selector)

## Solvent Selection

TS 5.2.3 Pateikiamas vožtuvas, kuris leidžia pasirinkti 12 skirtingų eliuentų.

The 12-position/13-port solvent selection valve (G4235A) can be used for solvent selection (flow rate < 10 mL/min) as illustrated in [Figure 5](#) on page 20. It offers automated access to 12 different eluents.

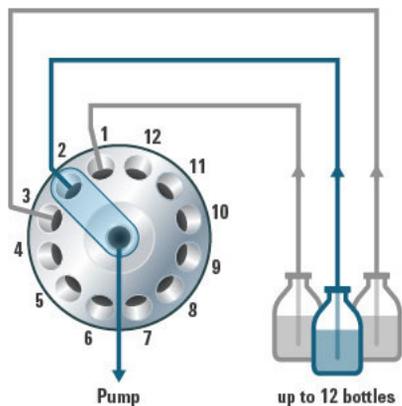


Figure 5 Solvent Selection (Schematic Setup)

# Agilent 6475 Triple Quadrupole LC/MS System

TS 5.; 5.6 Agilent 6475 masių  
spektrometrijos detektorius



## Introduction

The Agilent 6475 triple quadrupole LC/MS system delivers superior robustness, versatility, and sensitivity for targeted and routine trace-level applications. Built on a trusted ion optics platform, it contains a multitude of technological advantages, such as VacShield ion injection, an octupole ion guide, heated hyperbolic quadrupoles, a curved and tapered collision cell, and an advanced 20 kV detector assembly. This hardware is augmented by powerful and sophisticated onboard instrument intelligence, such as early maintenance feedback, intelligent reflex (iReflex) automated secondary injection, scheduled SWARM autotune/checktune, and a fully automated method optimizer. The combination of powerful hardware with sophisticated instrument intelligence will help you achieve peak analytical performance, high sample throughput, and confidence in your results.

## Instrument performance specifications

	Specification	Additional Information
IDL Positive Ion	IDL <3.5 fg	10 fg reserpine on column. Calculated at the 99% confidence limit. (demonstrated at installation as instrument checkout)
IDL Negative Ion	IDL <4 fg	10 fg chloramphenicol on column. Calculated at the 99% confidence limit.
<u>S/N Positive Ion</u>	<u>S/N &gt;850,000:1</u>	<u>1 pg reserpine on column</u> TS 5.6.6 S/N 850 000:1 esant 1 pg rezepino teigiamoje jonizacijoje ir S/N 850 000:1 esant 1 pg chloramfenikolio neigiamoje jonizacijoje
<u>S/N Negative Ion</u>	<u>S/N &gt;850,000:1</u>	<u>1 pg chloramphenicol on column</u>
<u>Mass Range</u>	<u>m/z 5 to 3,000</u>	TS 5.6.2 nustatomų masių intervalas 5-3000 m/z
<u>Mass Scan Rate</u>	<u>18,700 Da/sec</u>	TS 5.6.3 Maksimalus skenavimo greitis 18700 Da/s
<u>Mass Resolution (FWHM)</u>	Narrow: 0.4 Da (m/z 5 to 1,500) Unit: 0.7 Da Wide: 1.2 Da Widest: 2.5 Da	Expected FWHM peak width of each ion TS 5.6.7 Rezoliucija (FWHM) 0,4 Da
<u>Mass Accuracy</u>	±0.1 Da from m/z 5 to 1,000 ±0.2 Da from m/z 1,000 to 2,000 ±0.3 Da from m/z 2,000 to 3,000	TS 5.6.8 Masių tikslumas 0,1 Da
<u>Mass Stability</u>	<0.1 Da in 24 hrs	The mass stability of <0.1 m/z with m/z 2,122 and m/z 2,234 in 24 hours is capable when operated in the temperature range of 25 ±5 °C and the rate of the temperature change is ≤1 °C per hour TS 5.6.9 Masių stabilumas 0,1 Da/24 val
<u>MRM Acquisition Rate</u>	<u>500 MRM/s</u>	TS 5.6.10 MRM surinkimo greitis 500 MRM/s
MRM Minimum Dwell Time	0.5 ms	
Maximum MRM Transitions	33,000 MRM/method 500 MRM/segment	
Maximum Dynamic MRM Transitions (dMRM)	4,000 dMRM/method	
Maximum Triggered MRM Transitions (tMRM)	10 tMRM/compound (primary and secondary) for product ion confirmation and library search	
Maximum Concurrent dMRM/tMRM Transitions	500 concurrent transitions	
<u>Detector Dynamic Range</u>	>6 x 10 <sup>6</sup> , six-orders of linear dynamic range	TS 5.6.4 dinaminis diapazonas 6 x 10 <sup>6</sup>
Detector High Energy Dynode Modes	Standard: -10 kV and +18 kV Large molecule: -20 kV	
Detector Gain Adjustment	0.1x to 10x	Adjustable per time segment
<u>Polarity Switching Time (Electronics)</u>	<25 ms	TS 5.6.5 Minimalus jonizacijos poliškumo keitimo intervalas 25 ms
Collision Cell Clearance Time	<1 ms	

## Accessories and other features

<u>Ionization Sources</u>	<ul style="list-style-type: none"> <li>– <u>Agilent Jet Stream technology (AJS) – included</u> <b>TS 5.6.1 ESI jonų šaltinis</b></li> <li>– Electrospray ionization (ESI)</li> <li>– Atmospheric pressure chemical ionization (APCI)</li> <li>– Multimode ionization (MMI) – simultaneous APCI and ESI</li> <li>– Agilent nanospray ESI source – for low flow applications</li> </ul>
Software Systems	Single point of control using Agilent MassHunter Workstation software for LC/TQ – includes acquisition, data analysis, and reporting
<u>Acquisition Modes</u>	<u>Full scan, product ion scan, precursor ion scan, neutral loss scan, neutral gain scan, single ion monitoring (SIM), multiple reaction monitoring (MRM), dynamic MRM (dMRM), triggered MRM (tMRM), and mixed mode.</u> <b>TS 5.6.11 Matavimo režimai</b>
Intelligent Data Acquisition Features	<ul style="list-style-type: none"> <li>– <b>SWARM autotune</b> explores the multidimensional parameter space using artificial intelligence – particle swarm optimization</li> <li>– <b>Triggered MRM</b> data-dependent MRM recording of additional product ions for library searching and distinguishing of isobaric analytes</li> <li>– <b>Intelligent Reflex (iReflex)</b> for automated secondary reinjection logic (carryover detection, above upper LOQ detection, and fast screening) <b>TS 5.6.13 išmaniosios iReflex funkcijos</b></li> <li>– <b>Method-oriented compound and source optimizer</b> provides an integrated automated/guided approach to accelerate the fine tuning and development of methods <b>TS 5.6.12 funkcija, leidžianti pilnai automatinį MRM tranzicijų ir jonų šaltinio parametrų optimizavimą pateikiant tik nustatomo junginio cheminę formulę.</b></li> </ul>
Maintenance	<ul style="list-style-type: none"> <li>– <b>VacShield</b> for common front-end ion injector maintenance without venting</li> <li>– <b>Parameter-free autotune and checktune</b> uses the SWARM algorithm to explore the multidimensional space without user intervention (checktune and autotune compatible with AJS, APCI, MMI ion source)</li> <li>– <b>Scheduled checktune and autotune</b> to ensure that instrument is ready and within tolerance at scheduled timepoints</li> <li>– <b>Early maintenance feedback</b> dashboard reports status of critical components to prepare for and anticipate downtime</li> </ul>

## Physical instrument specifications

Instrument Dimensions (Depth × Width × Height)	77.3 × 84 × 47.5 cm
Instrument Weight	117 kg

## Ordering information

The G6475AA must be ordered in conjunction with M5930AA or M5940AA depending on the need to operate on a local workstation configuration or networked workstation configuration.

- Agilent 6475 triple quadrupole LC/MS system with AJS ion source and PC workstation (G6475AA) **TS 5.8 Kompiuterinė darbo stotis pristatoma kartu su siūloma sistema ir jos techninės savybės pilnai suderintos su siūlomos sistemos gamintojo keliamais reikalavimais.**
- Agilent MassHunter Workstation software for LC/TQ (M5930AA)
- Agilent MassHunter Networked Workstation software for LC/TQ (M5940AA)

## Disclaimer

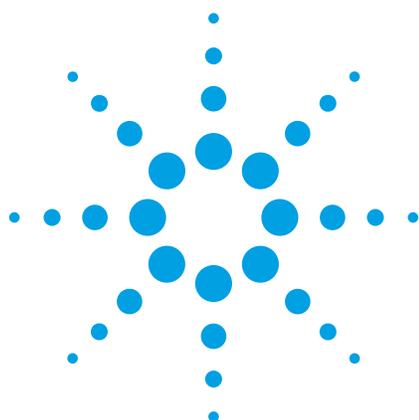
Performance and checkout at installation uses instrument detection limit (IDL), which is a meaningful and statistically relevant measurement of instrument sensitivity. The signal-to-noise (S/N) ratio specification does not predict the limit of detection (LOD) or limit of quantitation (LOQ) for the system of user application. S/N applies only to the conditions or concentrations specified and cannot be extrapolated to any other conditions or concentrations. On-site demonstration of S/N must be purchased as an add-on, and will only be carried out on newly purchased standard Agilent 1260 Infinity II Prime or 1290 Infinity II LC systems with an Ultra Clean tubing kit.

[www.agilent.com/chem/6475](http://www.agilent.com/chem/6475)

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TS 5.6.1 AJS jonų šaltinis yra ESI tipo

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Santa Clara, CA, USA

# Agilent Jet Stream Thermal Gradient Focusing Technology

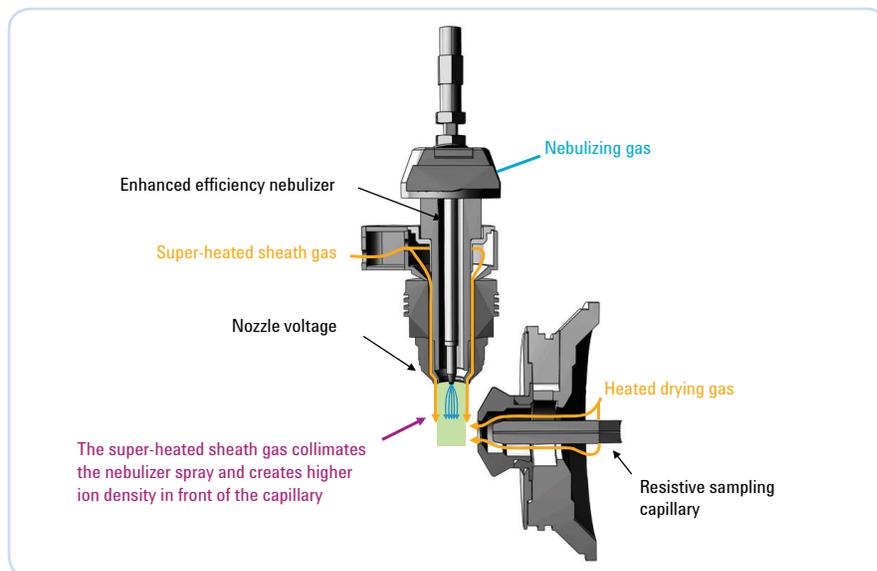
Electrospray ionization mass spectrometry (ESI-MS) is a sensitive technique that is used extensively for the analysis and identification of small molecules and proteins. Proprietary Agilent Jet Stream thermal gradient focusing technology optimizes ESI conditions to produce dramatic gains in sensitivity, decreasing sample size requirements, increasing sample throughput, improving assay robustness and reducing the LODs and LOQs of screening and quantitation applications.

## Agilent Jet Stream technology enhances ESI-MS sensitivity

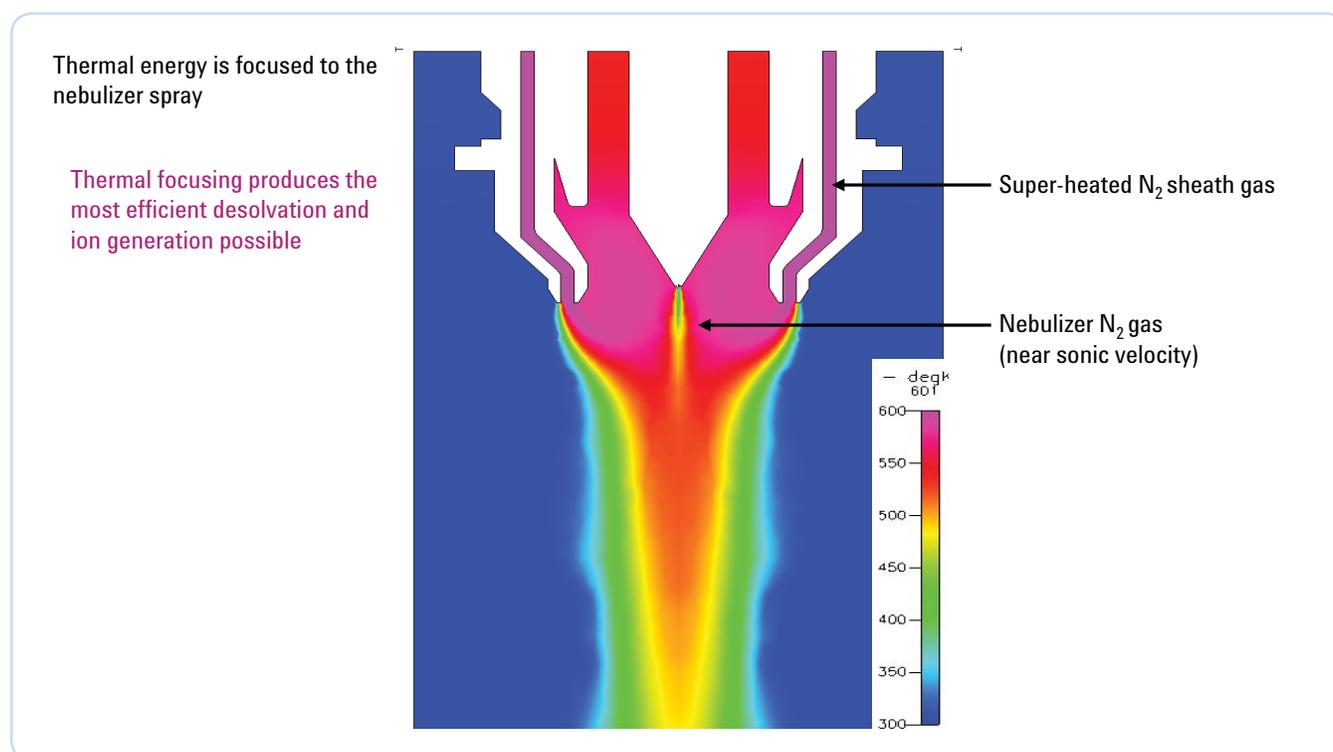
Agilent Jet Stream thermal gradient focusing technology was developed to significantly enhance sensitivity in ESI-MS by improving the desolvation and spatial focusing of ions. Super-heated nitrogen sheath gas confines the nebulizer spray to more effectively dry

ions and concentrate them in a thermal confinement zone (**Figures 1-3**).

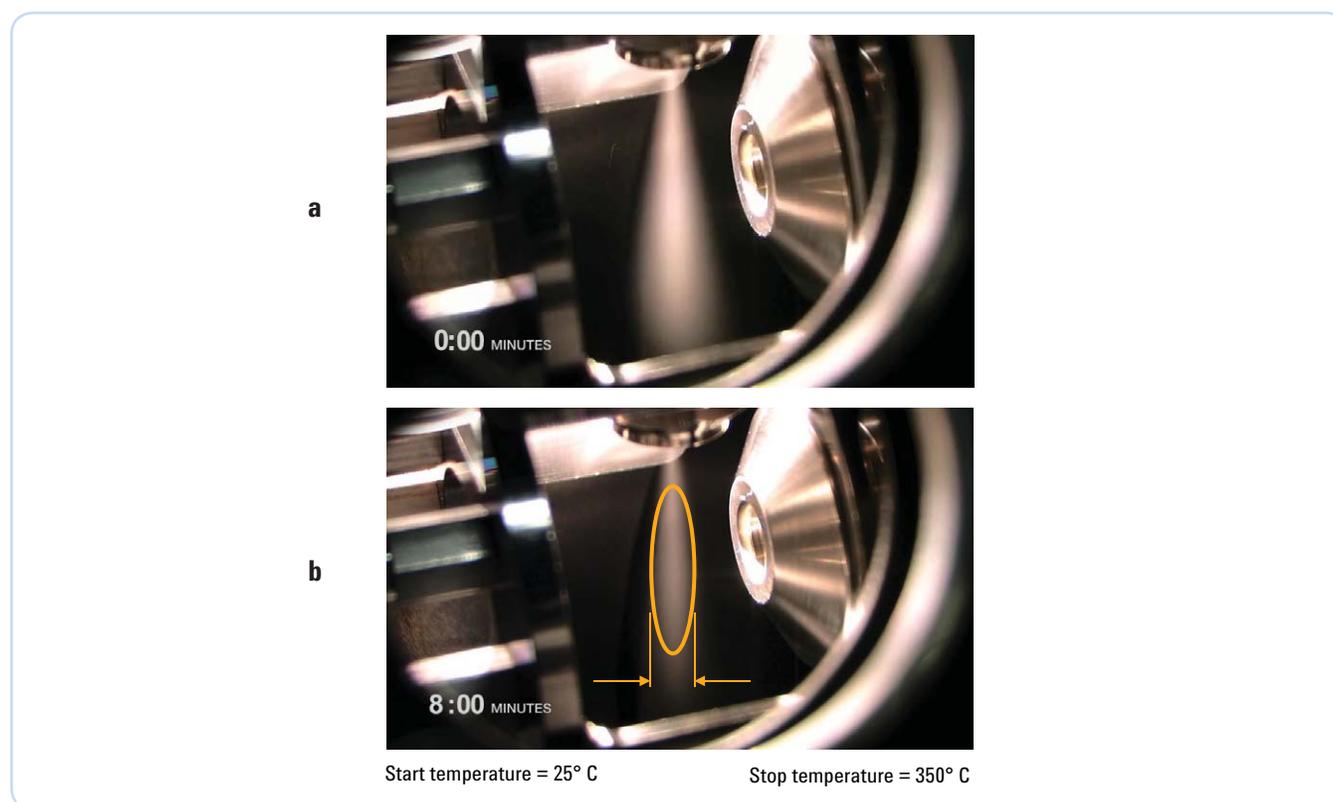
Desolvation reduces noise. Full confinement of the spray by the super-heated nitrogen gas eliminates sample recirculation and reduces peak tailing.



**Figure 1.** Agilent Jet Stream technology utilizes super-heated nitrogen to desolvate the spray and confine the electrospray plume making more ions accessible to sampling by the mass spectrometer.

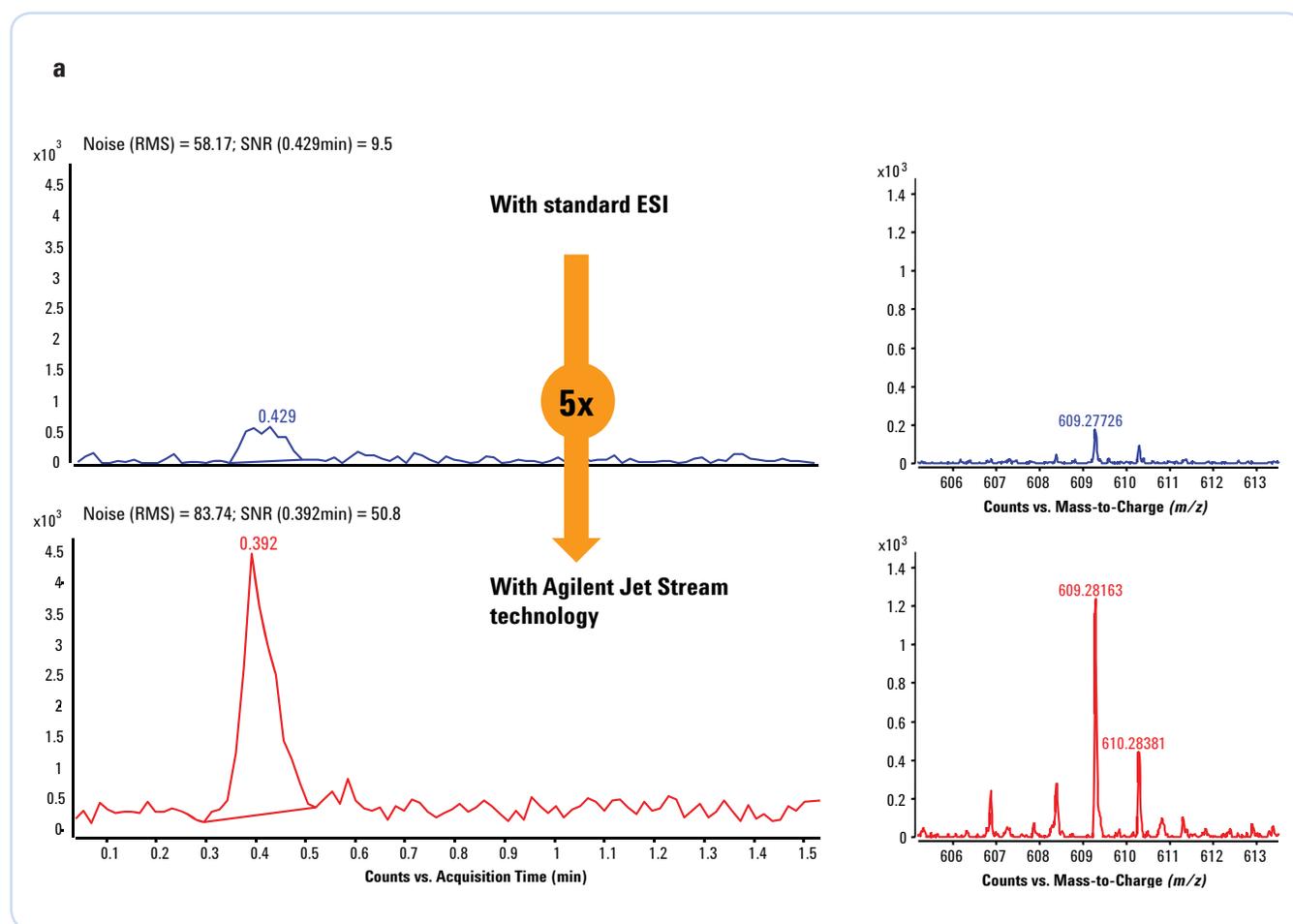


**Figure 2.** Simulation showing the thermal profile of the Agilent Jet Stream technology. Note the creation of a thermal confinement zone by introduction of a super-heated N<sub>2</sub> sheath gas.

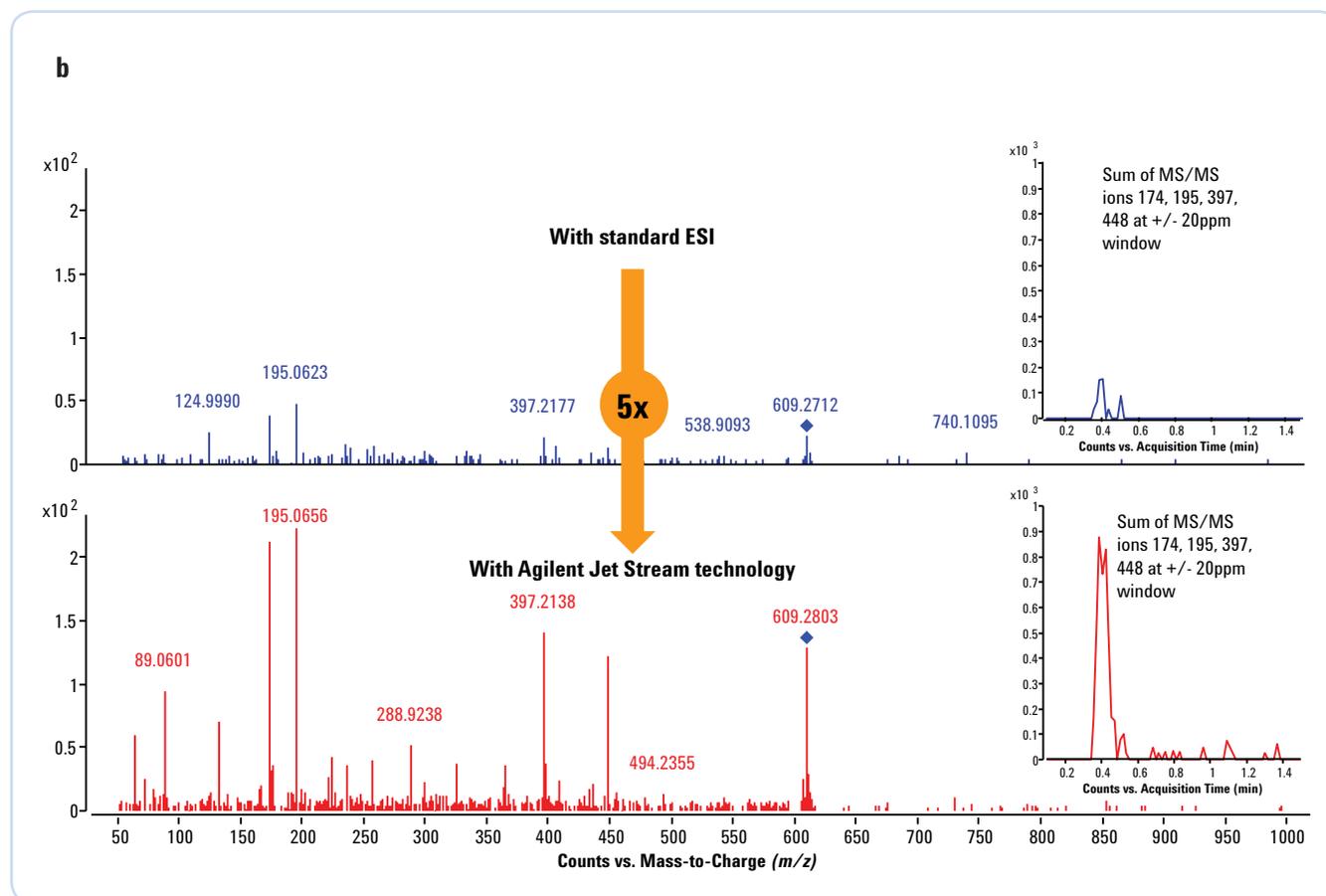


**Figure 3.** Time lapse images of an electrospray generated using Agilent Jet Stream technology at (a) 25° C and (b) 350° C. Less light scattering is observed in the spray at 350° C, indicating enhanced desolvation.

Improved ion production results in higher MS and MS/MS signal intensities and improved signal-to-noise ratios. On average, a 5 to 10-fold improvement in MS and MS/MS sensitivity is realized by using Agilent Jet Stream technology (Figures 4a and 4b).



**Figure 4a.** Comparison of the MS spectra of a 1 pg sample of the drug reserpine obtained using conventional Agilent ESI source and Agilent Jet Stream technology on an Agilent 6530 Accurate-Mass Q-TOF LC/MS system. A 5-fold gain in signal intensity is observed with Agilent Jet Stream technology. LC conditions: Agilent 1200 LC system. Column: 2.1 x 30 mm Zorbax SB-C18, 3.5  $\mu$ m; flow rate: 0.4 mL/min of 75:25 methanol/water containing 0.1% (v/v) formic acid and 5 mM ammonium formate. Agilent Jet Stream technology conditions: sheath gas temperature: 350° C; sheath gas flow: 12 L/min.



**Figure 4b.** Comparison of the MS/MS spectra of a 1 pg sample of the drug reserpine obtained using conventional Agilent ESI source and Agilent Jet Stream technology on an Agilent 6530 Q-TOF LC/MS system. A 5-fold gain in signal intensity is observed with Agilent Jet Stream technology. Conditions: same as for figure 4a.

The Agilent Jet Stream technology provides exceptional ESI-MS sensitivity over a wide range of flow rates. Sensitivity gains of 5-10x were seen over flow rates ranging from 50  $\mu$ L/min to 2.5 mL/min, with the greatest gains typically seen at flow rates from 0.25-1.0 mL/min. Importantly, recommended operating parameters were consistent across a wide range of flow rates, reducing the need for optimization at different flow rates. The following conditions resulted in optimal results over flow rates ranging from 0.25

to 2.0 mL/min (typical flowrates for 2.1 mm ID HPLC columns):

- Sheath Gas Flow: 11 mL/min
- Sheath Gas Temperature: 350° C
- Nozzle Voltage: 600 V
- Nebulizer Pressure: 30 psi
- Chamber Voltage: 4 kV

(The recommended default operating parameters for the Agilent Jet Stream technology are relatively invariant with HPLC flow rate but should be optimized for best analyte response).

## Applications

### Trace Analysis of Pesticides

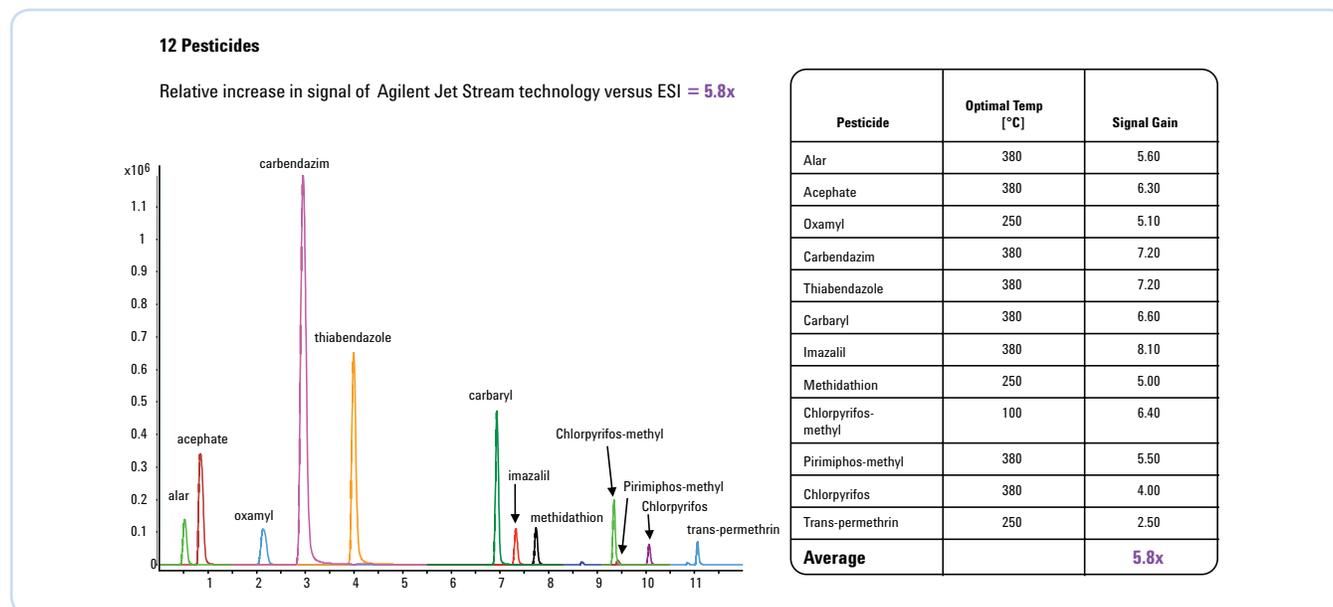
Sensitive and reliable analytical methods for the routine monitoring of pesticide residues are required in food safety and environmental applications. Agilent Jet Stream technology enables highly sensi-

tive analysis of pesticides as shown in **Figure 5**. Compared to conventional ESI, an almost 6-fold improvement in sensitivity was realized.

### Drug Analysis in Biological Matrices

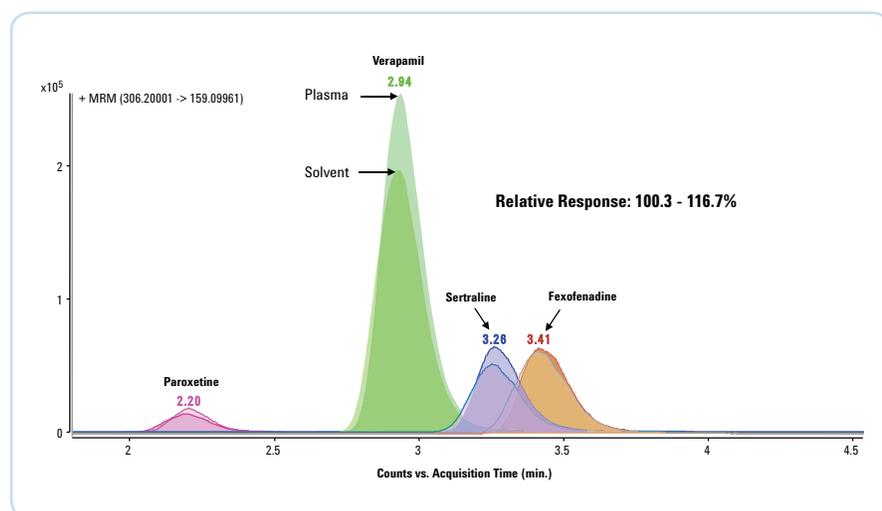
LC-MS and LC-MS/MS detection are routinely used for the analysis of drugs in biological fluids. Agilent Jet Stream

technology based LC/MS analyses of four therapeutic drugs in pure solvent and in blood plasma are presented in **Figure 6**. MS analysis in biological media is often adversely affected by ion suppression, but in this particular application no such matrix effects are observed with the Agilent Jet Stream technology.



**Figure 5.** LC/MS analysis of a mixture of pesticide standards in methanol/water using Agilent Jet Stream technology on an Agilent 6460 triple quadrupole LC/MS system. The table shows the relative gain in ion signal intensities using Agilent Jet Stream technology compared to conventional ESI.

LC Conditions: Agilent 1200 LC system. Column: 2.1 x 100 mm Eclipse Plus C18, 1.8  $\mu$ m; flow rate: 0.4 mL/min; gradient: water: methanol containing 0.1% formic acid and 10 mM ammonium formate. Agilent Jet Stream technology conditions: sheath gas temperature: programmed for best analyte response between 100-380° C; sheath gas flow: 10 L/min.

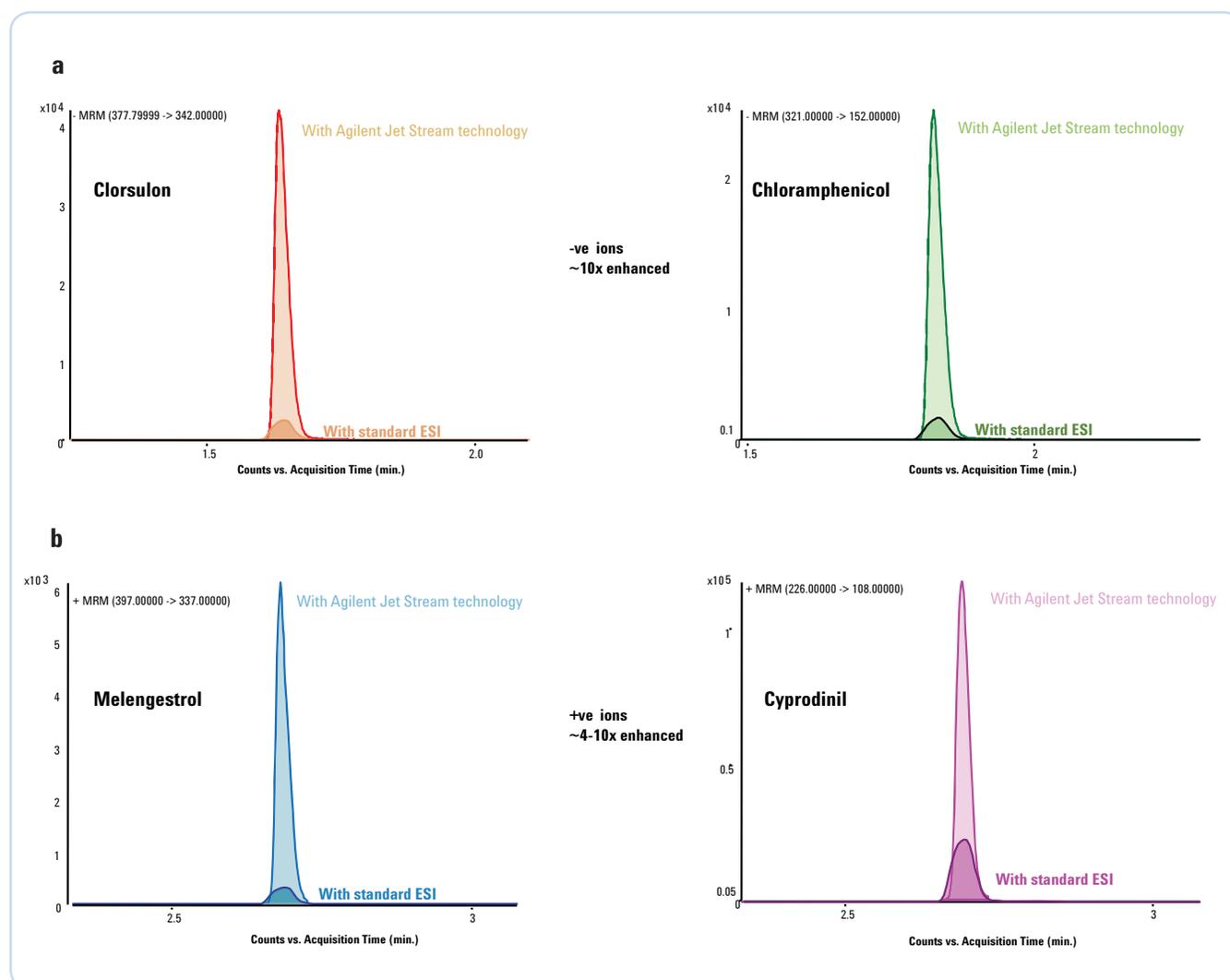


**Figure 6.** LC-MS analysis of four therapeutic drugs in pure solvent and in plasma on an Agilent 6460 triple quadrupole LC/MS system. LC Conditions: Agilent 1200 LC system. Column: 2.1 x 12 mm C8 guard column (5  $\mu$ m) in-line with 2.1 x 100 mm C18 (3.5  $\mu$ m) analytical column; gradient: acetonitrile: water (90:10 v/v).

## Human Health Care Products in Drinking Water

Significant sensitivity enhancements were observed for the analysis of four

pharmaceutical compounds in drinking water samples (**Figure 7**).

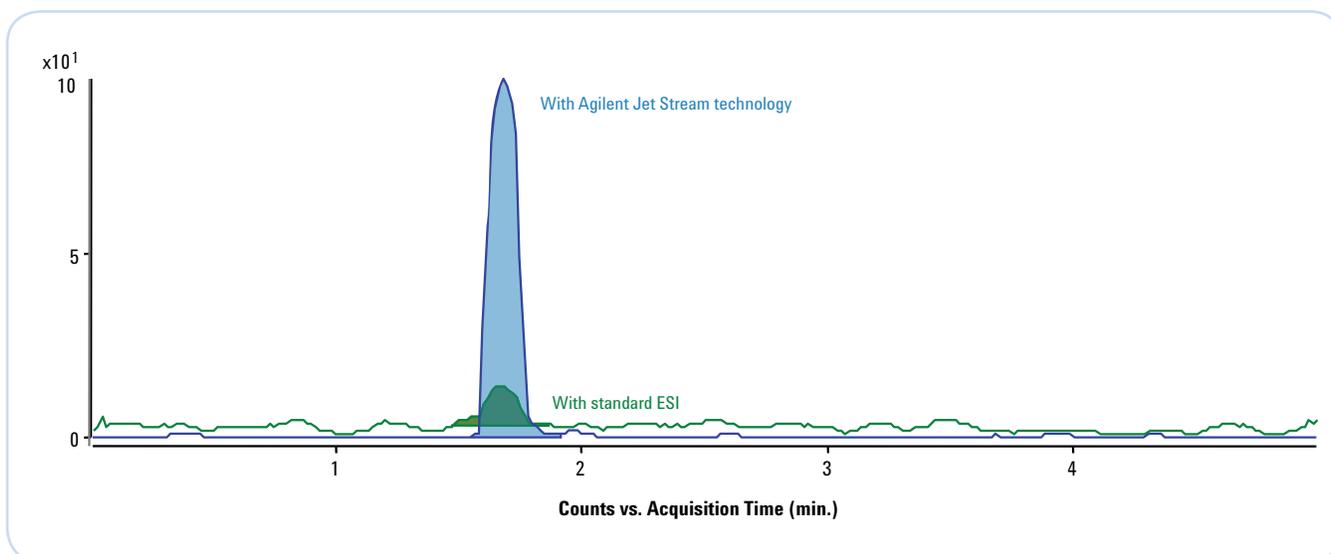


**Figure 7.** Pharmaceuticals spiked into potable water analyzed in **(a)** negative ion mode and **(b)** positive ion mode. Compared to conventional ESI (lower traces in each of the four graphs), Agilent Jet Stream technology enabled sensitivity improvements of approximately 10-fold in negative ion mode and between 4-to-10-fold in positive ion mode. Injected volume was 5  $\mu$ L of a 50 ppb solution. LC Conditions: Agilent 1200 LC system. Column: 2.1 x 50 mm Zorbax Eclipse Plus C-18, flow rate: 0.5 mL/min, gradient: A=water, B= methanol, 5% B to 90% B. Agilent Jet Stream technology conditions: sheath gas temperature: 380 $^{\circ}$  C, sheath flow: 11 L/min.

### Illicit Drugs in Urine

Agilent Jet Stream technology was used for LC/MS detection and quantitation of the illicit drug MDMA in urine (**Figure 8**).

Significant sensitivity gains were seen with the use of Agilent Jet Stream technology versus standard ESI.



**Figure 8.** Analysis of MDMA spiked into urine (50 fg on-column) by standard ESI (green trace) and Agilent Jet Stream technology (blue trace) on an Agilent 6460 Triple Quad LC/MS system. LC Conditions: Agilent 1200 LC system. Column: Zorbax Eclipse Plus C-18 (2.1 x 50 mm, 1.8  $\mu$ m), flow rate: 0.5 mL/min, gradient: A=water with 0.1% formic acid, B=acetonitrile with 0.1% formic acid, 5% B to 100% B.

## Conclusions

Agilent Jet Stream thermal gradient focusing technology enables a 5-10 fold sensitivity improvement over ESI at conventional flow rates (50  $\mu\text{L}/\text{min}$ -2.5  $\text{mL}/\text{min}$ ). Dramatically improved ion desolvation and confinement of the spray by a thermal gradient yield improved ion generation and sampling efficiencies for significantly increased signal and reduced noise. Agilent Jet Stream technology is suited for today's most demanding applications—it provides maximum sensitivity for the analysis of pharmaceutical compounds to support drug development applications and trace-level pesticide and chemical analysis to assure environmental quality and food safety.

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# Advances in Mass Spectrometry Instrument Intelligence





## Overview

There is a global trend towards more self-aware, intelligent tools meant to make life easier. The field of liquid chromatography/mass spectrometry is no different with the move to automate difficult and challenging tasks, making mass spectrometry more accessible. These advances increase instrument uptime, streamline workflows, save time with immediate validated results and ultimately reduce cost-of-ownership.

In this poster collection, you will take a deep dive into the next evolution of our LC/MS instrument portfolio. The new 6475 triple quadrupole LC/MS includes easy-to-use, yet sophisticated onboard intelligence for routine analysis. We will demonstrate how the new intelligence features can improve analytical performance and lab productivity, providing you with peace of mind for day-to-day operation.

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# Develop Methods Faster Using Our Intelligent Optimizer



## An end-to-end software algorithm for LC/MS/MS method development, optimization, and QA/QC deployment

Authors: Anding Fan, Vicky He, James Pyke, Erik Lopez,  
Stephanie Aurand, Linfeng Wu, Patrick M. Batoon

TS 5.6. Yra funkcija, leidžianti pilnai automatinį MRM tranzicijų ir jonų šaltinio parametrų optimizavimą pateikiant tik nustatomo junginio cheminę formulę.

### Introduction

The act of developing targeted triple quadrupole LC/MS (LC/TQ) methods from start to finish is a complex and time-consuming, multi-step workflow. Method development becomes even more challenging if former mass spectrometry parameters for each analyte were not established – especially in the case of novel compounds. In such cases, “by-hand” optimization and characterization is needed to obtain the most effective MRM parameters.

Using the new 6475 triple quadrupole LC/MS system with MassHunter 12, intelligent workflows were added to ensure that users, particularly in routine analysis QA/QC lab environments, can maximize their operational efficiency. One aspect of LC/MS/MS analysis that may benefit from efficiency improvements is with the assisting

and automation of method optimization. MassHunter 12 features an embedded 21CFR compliant, method-oriented, intelligent optimizer; allowing users to optimize MRMs and ion source parameters in a fully-automated or semi-automated fashion.

Using a modular end-to-end workflow approach, users may input chemical formula information which will result in (1) optimized MRM transitions for each compound and (2) optimal ion source parameters for the overall method. A unique feature of this algorithm is the ability to take advantage of the LC/TQ's speed to allow the simultaneous optimization of multiple compounds on a per-method basis, such that pre-production method development time is dramatically reduced compared to compound-by-compound approaches.

## Experimental

Chemical formulas of the neutral analytes found in the LCMS 7-Analyte Sys Suitability Standard (amitriptyline hydrochloride, diethyl phthalate, diamyl phthalate, dihexyl phthalate, dioctyl phthalate, 8-bromoguanosine hydrate, and 4-chlorocinnamic acid) were entered into the method development interface to automatically calculate the potential [M+H]<sup>+</sup> or [M-H]<sup>-</sup> precursor ions.

The optimization workflow was done unattended in two major phases. First, MRM optimization: precursor fragmentor voltage, RT determination (optional) Product Ion selection, and MRM collision energy voltage. Then, ion source optimization: drying gas heater, sheath gas heater, capillary voltage, nebulizer pressure, drying gas flow, sheath gas flow and nozzle voltage.

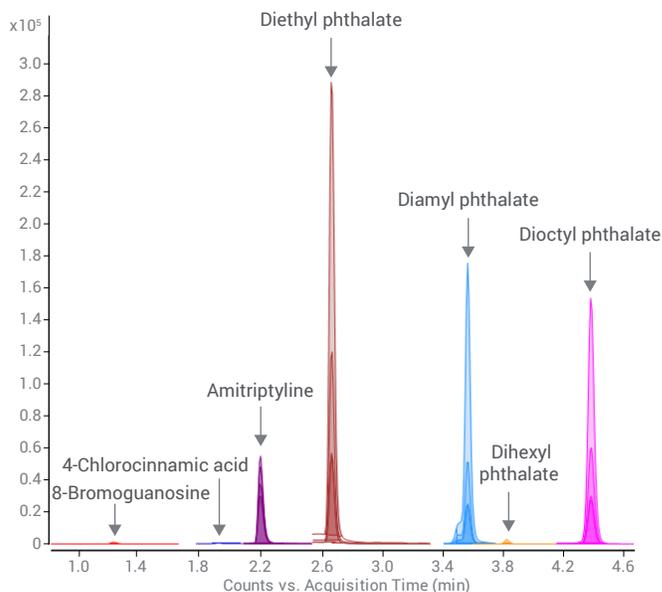
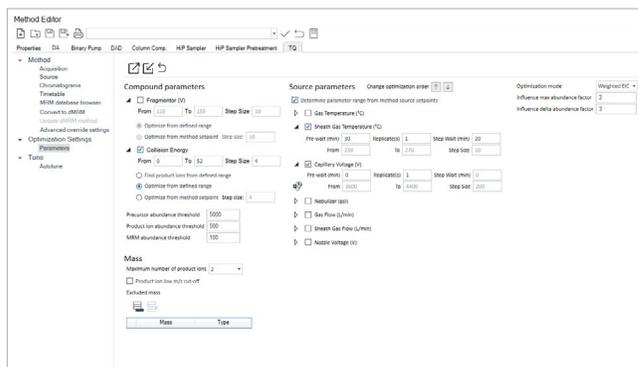


Figure 1: Fully optimized 7-analyte standard mixture chromatogram created from scratch.

## MassHunter 12's Intelligent Optimizer enables comprehensive method development and parameter validation



## Results and Discussion

### The End-to-End Optimization Workflow

The new intelligent optimization software algorithm, provides a complete, user-friendly, workflow approach to the tedious task of method development. Through this approach, a user may create a new method by inputting neutral analyte formulas, importing an existing MRM list from CSV, adding uncharacterized analytes to an existing method, or fine-tuning existing MRM or source parameters.

Compound and source parameters to be optimized are selected via the "Optimization parameters" page in the Method Editor with customizable user-input ranges and step sizes. An example of the optimization workflow is described in the diagram below.

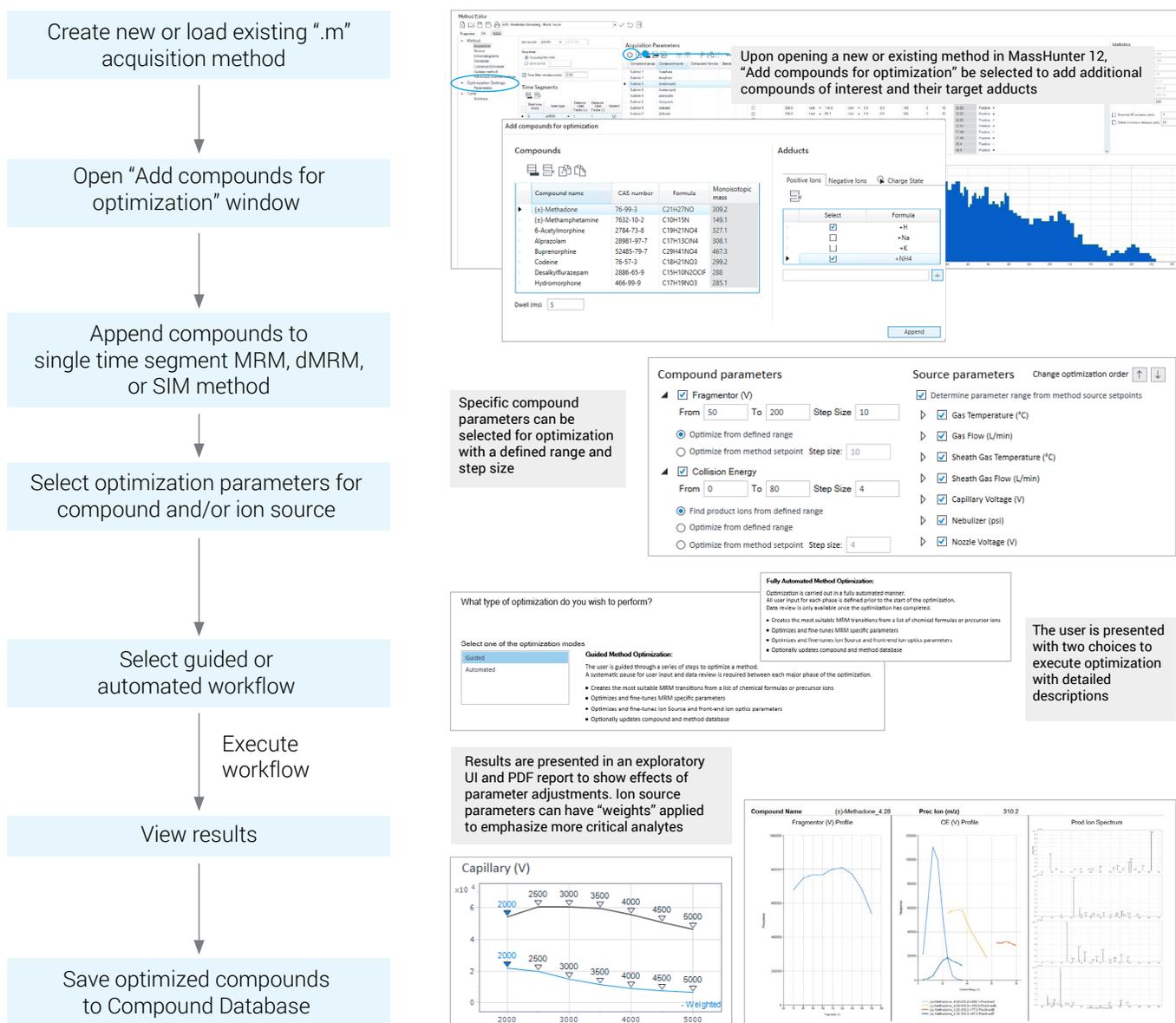


Figure 2: Screenshots of the method optimizer user interface from setup to results.

## Results and Discussion

### Guided Optimization Workflow

Through this workflow, optimization is carried out in two major steps.

1. MRM specific parameters are optimized to find the ideal product ions, fragmentor voltage, and collision energy voltage and retention time assignment (applied to injection with column) per analyte. The workflow will then pause to allow reviewing of data quality as it pertains to each compound.
2. Once ready, ion source parameters are optimized on a "global" basis to maximize the total ion current (unweighted - TIC based optimization) or with applied weights to priority analytes (weighted - EIC based optimization).

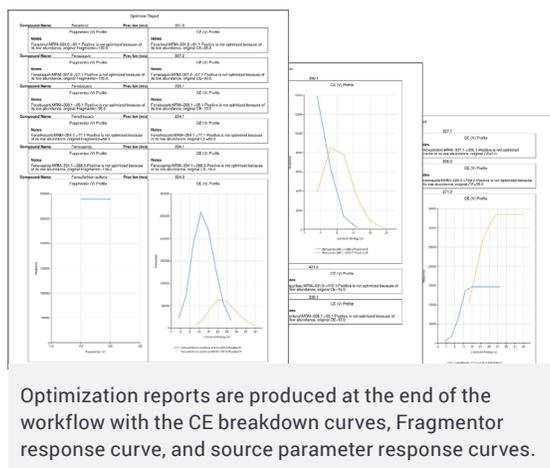
The method will be updated throughout the optimization process in stepwise fashion to create the final method. The user can save their transitions to the compound database to later apply to other methods.

### Automated Optimization Workflow

Through this workflow, optimization is carried out without pause, allowing the user optimize multiple methods in sequence.

Like Guided optimization, this workflow will also provide the user with a method that will include the best MRM transitions, collision energies, and voltages based on the parameters selected for optimization. It will also provide the user with fine-tuned source settings created specifically for that method. It can, however, run multiple methods instead of a single one.

During this process, everything is completely automated and will transition from MRM to ion source optimization immediately. The user will not have the ability to view and update results or change the instrument settings.



Optimized compounds can be immediately added into the compound MRM repository, allowing users to build future methods quickly and efficiently.

Compound Name	CAS	Formula	Nominal Mass	Ion Species	Precursor	Product	Primary	Trigger	Polarity	Fragmentor	CE	Cell accelerator voltage (V)	RT (min)	RT Window (min)	Abundance	Trig
Edrophosph, 9.53	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	209	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	24	5	9.529	0.95	17695.31	
Edrophosph, 9.53	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	226.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	16	5	9.529	0.95	16468.03	
Edrophosph, 9.53	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	271	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	44	5	9.529	0.95	12526.68	
Edrophosph, 9.53	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	111	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	36	5	9.529	0.95	2842.04	
Edrophosph, 10.70	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	109	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	40	5	10.702	1.07	26578.45	
Edrophosph, 10.70	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	190.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	24	5	10.702	1.07	21218.48	
Edrophosph, 10.70	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	77	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	56	5	10.702	1.07	16285.75	
Edrophosph, 10.70	17109-49-8	C14H15O2P2S2	310	(M+H)+	311	65.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	80	5	10.702	1.07	13730.15	
Bromoxolol (Brominal)	1689-84-5	C7H18Br2NO2	274.9	(M+H)+	275.9	224	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	100	16	5	9.006	0.9	5170.98	
Bromoxolol (Brominal)	1689-84-5	C7H18Br2NO2	274.9	(M+H)+	275.9	272	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	100	26	5	9.006	0.9	2222.52	
Bromoxolol (Brominal)	1689-84-5	C7H18Br2NO2	274.9	(M+H)+	275.9	233.2	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	100	20	5	9.006	0.9	946.71	
Bromoxolol (Brominal)	1689-84-5	C7H18Br2NO2	274.9	(M+H)+	275.9	76.8	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	100	80	5	9.006	0.9	171	
Etonazole	153233-91-1	C21H23F2NO2	358.2	(M+H)+	360.2	140.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	36	5	12.793	1.28	86572.08	
Flonazone	151316-84-1	C21H26F2NO2	362.2	(M+H)+	360.2	132.9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	77	5	12.793	1.28	88971.01	
Itosazole	153233-91-1	C21H23F2NO2	358.2	(M+H)+	360.2	85.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	80	5	12.793	1.28	23150.94	
Etonazole	153233-91-1	C21H23F2NO2	358.2	(M+H)+	360.2	304.1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Positive	90	20	5	12.793	1.28	19673.16	

Figure 3: Finalized results are printed in an optimization report, stored as method revisions, and saved in a compound repositior.

## Conclusions

The new 6475 triple quadrupole LC/MS system with MassHunter 12 includes an intelligent MRM and source optimizer that is built into the method editor. The final result is a dMRM method with fully optimized parameters, MRM transitions, and retention time assignments.

The intelligent optimizer can be used to (1) Create a new method from scratch, (2) Add new compounds to an existing method, (3) Fine tune or verify parameters of an existing method.

Optimization results can be reviewed by the user after workflow completed. Any changes to the method are saved in an auditable fashion in accordance with to 21 CFR Part 11 compliance.

# Ensure Confidence in Results While Processing Samples with Incredible Speed



## Active & iterative data-dependent reinjection logic for maintaining throughput, uptime, and consistency in triple quadrupole LC/MS analysis

Authors: Disha Shah, Emma E. Rennie, Lauren Seymour, Madhusudan Sharma, James S. Pyke, and Patrick Batoon

### Introduction

Triple quadrupole LC/MS measurements are often associated with targeted, quantitative, large batch sample analysis with an emphasis on non-stop continuous operation. Such use cases are in the continuous processing of QA/QC samples for contaminants in pharmaceuticals, pesticides and veterinary drug detection in foods, or measurements of biological analytes from a sizeable population. Regardless of application, consistent results, high sample throughput, and avoidance of sample reprocessing is highly desired.

To aid in the acquisition of high-quality data and high throughput measurement, the 6475 triple quadrupole LC/MS system with MassHunter 12 includes an intelligent worklist reinjection logic feature called Intelligent Reflex.

Herein, we present a technique utilizing an active and immediate data processing algorithm that evaluates and reinjects samples in a data-dependent manner based on the following Intelligent Reflex scenarios:

1. Detection of previous sample carryover
2. Detection of a sample outside of the calibration range
3. Fast analyte screening

## Experimental

Measurements were carried out using a 6475 triple quadrupole LC/MS system (G6475A) and MassHunter 12 software system which is coupled to an Infinity II 1290 HPLC system.

MassHunter 12 features new Intelligent Reflex workflows which enables a user to automatically add samples or blanks in a data-dependent manner. Ions were acquired in MRM mode to ensure that the signal was monitored as the analyte elutes. A worklist containing Blanks, Samples, and Calibration standards was created to stress test and demonstrate the data-dependent logic for all three Intelligent Reflex workflows.

A specific Quantitative analysis method is created for each workflow and analyte concentration thresholds are set to trigger secondary injection. Intelligent Reflex reinjection commands are defined as logical conditions in the Outliers section of the data analysis method and are based on the current abundance or concentration measurements for the sample or blank.

Intelligent Reflex is configured using the unified Acquisition and DA Analysis parameters. These parameters are used to create worklists that demonstrate and execute workflow logic. If the logical commands are activated, a new injection in the worklist is appended or inserted to iterate on until a pass condition is met.

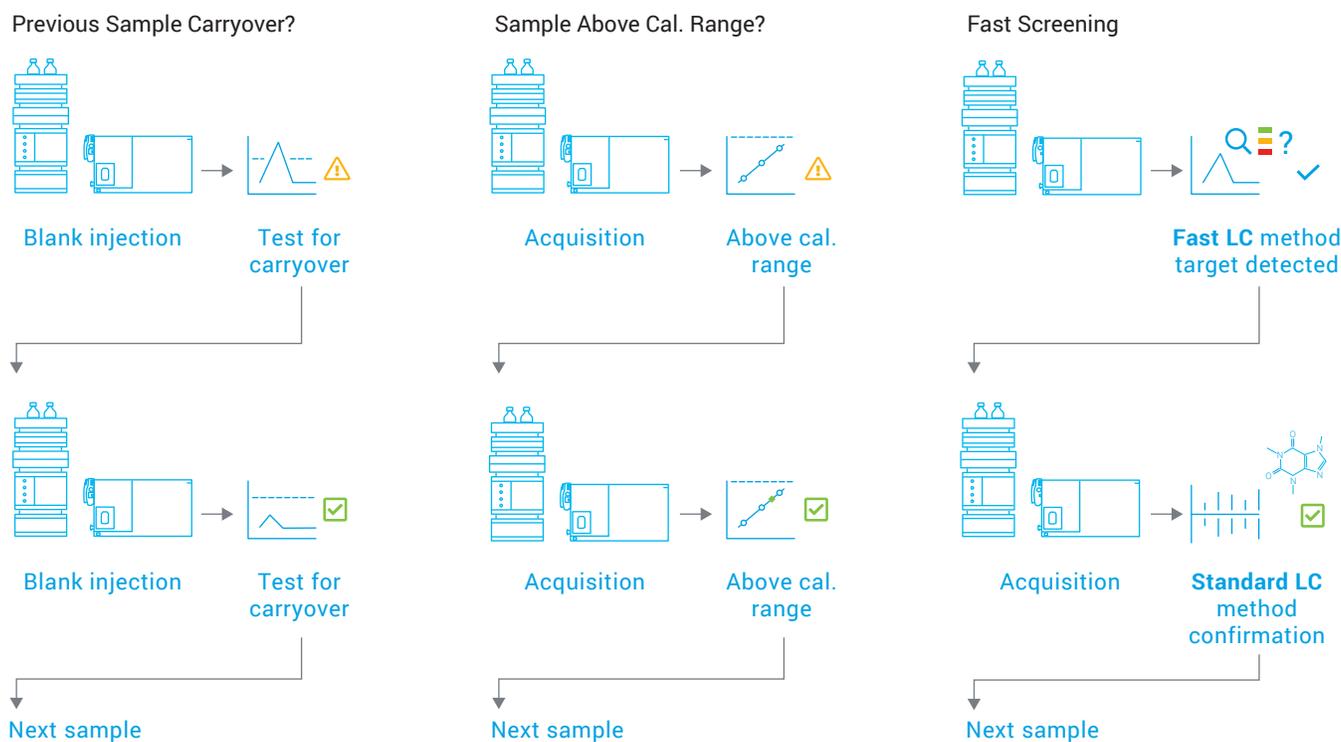


Figure 1: Intelligent Reflex Workflow logic.

## Results and Discussion

### Intelligent Reflex Workflows

MassHunter 12 Intelligent Reflex workflows evaluate and reinject blanks and samples in a data-dependent manner within a running worklist. The Intelligent Reflex Workflows:

- Enhance throughput for large batch sample analysis through automation.
- Boost lab productivity by reducing manual intervention and sample reprocessing.
- Save valuable sample material by automatically preventing carryover from contaminating a batch analysis.
- Automatically generate a combined report.

### The Carryover Intelligent Reflex Workflows

Sample Carryover or contamination is a very common problem which could be due to insufficient washout, contaminated wash vial, or overloading sample on column. Detection of carryover in a blank above the outlier threshold, will trigger the workflow to insert up

to n blanks. An additional option to pause the worklist if the maximum user defined n limit is met prevents contamination of samples.

TS 5.6.13 Automatinė mėginio pernašos (angl. carryover) apsauga įskaitant galimybę sistemoje numatyti sekos stabdymo parametras

### The Above Calibration Range Intelligent Reflex Workflow

Ensuring a target analyte concentration is within the calibration curve range is critical when quantifying analytical analytes. If an analyte is above the upper limit of quantitation (ULOQ), it is necessary to either dilute the sample or reduce the injection volume to bring the concentration within quantitation limits.

Detection of an analyte in a sample above the calibration range will trigger an insert/append re-injection with reduced volume to provide an estimated concentration.

TS 5.6.13 Automatinė mažesnio kiekio mėginio injekcija aptikus, jog analizė viršija kalibracinės kreivės

Figure 3 shows a worklist where an analyte has been detected as being above the calibration range set in the data analysis method. An additional blank is automatically appended before sample reinjection to ensure there is no carryover. The reduced injection volume is displayed in the worklist for each reinjected sample.

	Status	Method	Data File	Sample Type	iReflex Type
1	Completed	ESDemo_MRM method.m	Blank_1.d	Blank	Carryover
2	Completed	ESDemo_MRM method.m	Blank_1-CarryoverBlank-001.d	Blank	Carryover
3	Completed	ESDemo_MRM method.m	Sample_1.d	Sample	No iReflex Workflow
4	Completed	ESDemo_MRM method.m	Sample_2.d	Sample	No iReflex Workflow
5	Completed	ESDemo_MRM method.m	Blank_2.d	Blank	Carryover
6	Completed	ESDemo_MRM method.m	Blank_2-CarryoverBlank-001.d	Blank	Carryover
7	Completed	ESDemo_MRM method.m	Blank_2-CarryoverBlank-002.d	Blank	Carryover
8	Completed	ESDemo_MRM method.m	Sample_3.d	Sample	No iReflex Workflow

Previous sample carry over was detected after each predefined blanks

Additional blank injections inserted

Figure 2: Insertion of blanks when carryover is detected during ongoing analysis.

	Status	Method	Data File	Sample Type	Inj Vol (µl)	iReflex Type	iReflex Acq. Method	Red. Inj. Vol.
1	Completed	Above cal range.m	Blank_before run.d	Blank	As Method	No iReflex Workflow	Above cal range.m	
2	Completed	Above cal range.m	QC_before run.d	QC	As Method			
3	Completed	Above cal range.m	sample outside cal range_5.d	Sample	3	Above Cal. Range Append	Above cal range.m	0.5
4	Completed	Above cal range.m	sample inside cal range_5.d	Sample	1	Above Cal. Range Append	Above cal range.m	0.5
5	Completed	Above cal range.m	sample outside cal range_5-Fi-Blank.d	Blank	As Method	No iReflex Workflow		
6	Completed	Above cal range.m	sample outside cal range_5-iReflex.d	Sample	0.5	No iReflex Workflow		Reinjected with reduced sample volume

Figure 3: Appending a reinjection with lower injection volume due to original measurement reporting above ULOQ.

## Results and Discussion

### The Fast Screening Intelligent Reflex Workflow

Fast screening methods are commonly used to increase sample throughput. These methods are short, on the order of seconds to minutes, and identify presumptive positive samples which are then manually scheduled for reinjection and analyzed using a longer confirmation method. Automating the reinjection and analysis of a presumptive positive is critical to increasing throughput allowing labs to analyze more samples for more targets.

Upon detection of a presumptive positive in a fast screening method, this workflow will either insert or append a reinjection with a different analysis method for target confirmation. The insert action is used for confirmation methods with the same LC method, while the append action is used when a different LC method and/or column will be used for confirmation. If the insert action has been chosen, then a blank will be automatically inserted before and after the sample.

**TS 5.6.13 Įtariant tikslinės analizės buvimą mėginyje atlikus greitos analizės metodą (angl. screening) automatiškai atliekama to paties mėginio analizė pagrindiniu tikslinės analizės identifikacijos metodu.**

	Status	Method	Data File	Sample Type	iReflex Type	iReflex Acq. Method	Red. Inj. Vol.	First Tier Quant Method	Second Tier Quant Method
1	Completed	FS1.m	BlankData_B1.d	Blank	No iReflex Workflow	FS3.m		Quant FS method 1.m	Quant FS method tier2.m
2	Completed	FS1.m	QCData_Q1.d	QC					
3	Completed	FS1.m	Sampledata_S1.d	Sample	Fast Screening Insert	FS3.m		Quant FS method 1.m	Quant FS method tier2.m
4	Completed	FS1.m	Sampledata_S2.d	Sample	Fast Screening Insert	FS3.m		Quant FS method 1.m	Quant FS method tier2.m
5	Completed iReflex	FS3.m	Sampledata_S2-iReflex-Blank.d	Blank	No iReflex Workflow				D:\Projects\Secondary injection\Methods\Quant FS method tier2.m
6	Completed iReflex	FS3.m	Sampledata_S2-iReflex.d	Sample	No iReflex Workflow				D:\Projects\Secondary injection\Methods\Quant FS method tier2.m
7	Completed iReflex	FS1.m	Sampledata_S2-FI-Blank.d	Blank	No iReflex Workflow				D:\Projects\Secondary injection\Methods\Quant FS method tier2.m
8	Completed	FS1.m	Sampledata_S3.d	Sample	Fast Screening Insert	FS3.m		Quant FS method 1.m	Quant FS method tier2.m
9	Completed	FS1.m	BlankData_B2.d	Blank	No iReflex Workflow	FS3.m		Quant FS method 1.m	Quant FS method tier2.m

Figure 4: The worklist automatically inserts a confirmation method after detection of a presumptive positive.

### The new Agilent 6475 triple quadrupole LC/MS system



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The fast screening Intelligent Reflex workflow produces two different data batches; the 1st tier consists of the original worklist with the fast screening method. The 2nd tier batch consists of reinjected samples which are acquired and analyzed with a different, usually longer and comprehensive, confirmation method. Additional options are available to tailor these workflows to each unique analysis and lab SOP:

- Automatically produce a combined report created from the 1st and 2nd tier batch analyses.
- Append a blank before every appended 2nd tier sample or only before the first 2nd tier sample.
- Append a QC after  $n$  number of reinjections are appended to the worklist.
- Pause the worklist after the 1st tier analysis has completed for manual verification.

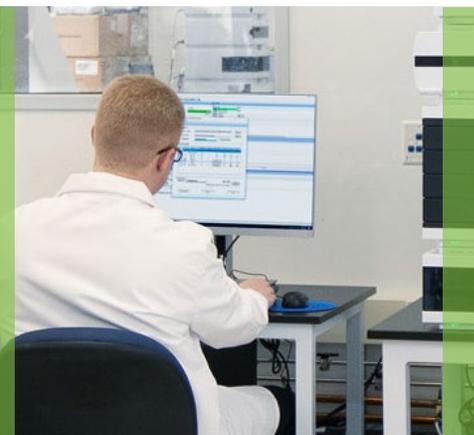
### Conclusions

The 6475 triple quadrupole LC/MS system with MassHunter 12 features an intelligent workflow called Intelligent Reflex.

Intelligent Reflex is an intelligent automated worklist reinjection logic tool to maximize analytical throughput or ensuring samples are within tolerance.

The three Intelligent Reflex workflows shown can operate concurrently in one worklist to ensure samples are measured within SOP guidelines.

# Maximize Uptime While Anticipating Downtime



## Accelerated lifetime testing with real-time Early Maintenance Feedback (EMF) diagnostic monitoring on the 6475 triple quadrupole LC/MS system

Authors: Michael B. Pastor, Ryan Rademacher, Patrick M. Batoon

### Introduction

Triple quadrupole LC/MS systems have become widely accepted as a platform for targeted, large-batch, sample analysis on a day-to-day basis. A primary concern for routine/targeted analysis is instrument stability; which can vary over time due to the soiling of crucial ion optics components. While incorporating an internal standard and measuring abundance ratio may help alleviate signal drift from a data-analysis standpoint, it does not give key indications to the quality of the instrument's health.

To help alleviate concerns on instrument health and longevity, the new Agilent 6475 triple quadrupole LC/MS system was designed with onboard intelligence that actively reports on the instrument health and status through Early Maintenance Feedback (EMF).

EMF reports various aspects pertaining to instrument maintenance such as "last tuned", number of samples injected, number of diverter valve switches, last rough pump oil change, last gas filter change, and real time reports on detector health, nebulizer blockage, ion injector blockage, and spray stability status.

Here we present a use case to trigger Early Maintenance Feedback (EMF) events to simulate heavy instrument use through 10,000 sample injections of spiked bovine urine. The sample matrix was specifically chosen due to the challenging endogenous components that may cause measurement issues (salts, metabolites, fats, proteins, etc.).

As this is not a true analytical method, the intention of this poster is primarily to stress the Early Maintenance Feedback mechanisms, test the instrument's response to heavy matrix accumulation, stability of tune parameters, and recovery of instrument tuning if out of spec.

## Experimental

Bovine urine diluted 1:1 in acetonitrile/water and were delivered to the system using an Infinity II 1290 HPLC with dual injector setup in overlapped injection mode with isocratic flow of 90:10 acetonitrile/water + 0.1% Formic acid.

To generate sufficient backpressure for stable HPLC operation and to simulate the use of an analytical HPLC column, a ZORBAX Extend-C18, 80Å, 2.1 mm, 1.8 µm, 1200 bar pressure limit, UHPLC guard column was used (821725-107), as shown in Figure 1.



**Figure 1:** A ZORBAX Extend-C18, 80Å, 2.1 mm, 1.8 µm, 1200 bar pressure limit, UHPLC guard column was appended directly to the nebulizer to simulate the passing of a sample through a chromatographic column.

MRM signals of various analytes were recorded to ensure that ions were reaching the detector. This current served to “age” the Electron Multiplier horn as if it were in standard/normal operation.

Early Maintenance Feedback (EMF) provided real time monitoring of the instrument health. EMF intelligence is incorporated in the systems firmware to monitor for crucial points along the ion path such as ion injector blockage, precipitation on the nebulizer, and detector’s estimated lifetime. Additionally, the instrument automatically monitored for commonly disruptive potential maintenance events such as poor spray stability and ion beam blockage events originating at the nebulizer or ion injector.

No cleaning or removal of the nebulizer, ion injector, or ion source chamber and spray shield was carried out over the course of the injection series.

## Post-Experiment Investigations

Upon completion of the injection series, an examination of the ion source and desolvation assembly was carried out to identify regions of ion burn, salt accumulation, broad matrix deposition, or potential modes of failure.

Tune ion abundances that were recorded during the Checktune procedure were plotted to evaluate the effects of matrix over time.

## The new Agilent 6475 triple quadrupole LC/MS system coupled with the 1290 Infinity II LC



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## Results and Discussion

### Pre-experiment to Post-experiment Physical Attributes

- Sample vial with diluted matrix (Bovine urine 1:1 acetonitrile/water).
- Sample overlaid MRM TIC every 1,000 injections.
- MS inlet after 10,000 injections. Spray shield and capillary cap with heavy contamination while maintaining ion injector performance.
- Skimmer with desolvation assembly removed. Cotton swabs with IPA to highlight matrix contamination in vacuum region after ion injector (front of skimmer, back of skimmer, octopole).

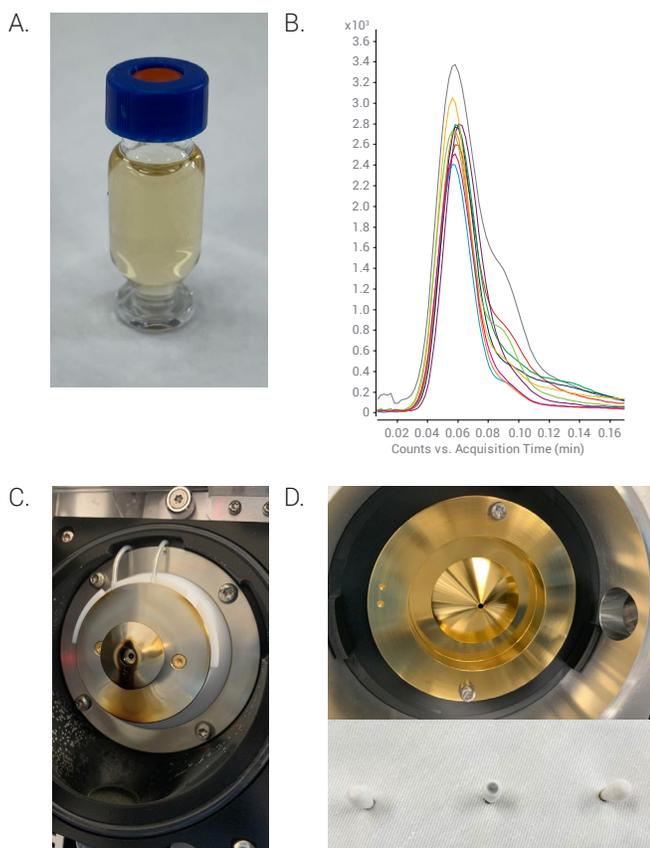


Figure 2: Experiment physical attributes.

### Tune Ion Tolerances as Matrix Components Accumulated Onto the Spray Chamber

Checktunes were performed every 1,000 injections with no cleaning of the nebulizer or ion injector (Figure 3). Despite heavy front-end contamination, mass calibration (m/z drift) and mass spectral peak width (FWHM) remained within tolerance and stable over the 10,000 injections. Tolerances for m/z < 1000, mass calibration must remain within  $\pm 0.1$  Da, while peak width must remain  $\pm 0.14$  Da. Over the course of injection series, the instrument reported an "Out of Tolerance" event at injection 6,000; this was remedied by running the Autotune procedure before proceeding to the next series of injections.

### No Critical Early Maintenance Feedback Events Were Triggered Over the Course of This Investigation

Early Maintenance Feedback continuously monitors for the most common sources of addressable issues pertaining to heavy routine analysis use. Over the course of this investigation, none of these events were triggered with the exception of "Injection Count" set to a threshold of 10,000 injections.

Despite constant bombardment of ions, detector health was observed to be stable and did not change to a considerable degree, the nebulizer and ion injector remained unclogged, and the spray stability remained consistent.

Detector EMV	Positive Mode	Negative Mode
Start	1212 V	1232 V
End	1198 V	1232 V

### Checktune Results Per 1,000 Injections

Checktune report after 10,000 injections shown in Figure 4 with passing result. Results for both positive and negative, MS1 and MS2, as well as various scan speeds and peak widths shown in a single page report (detailed also available).

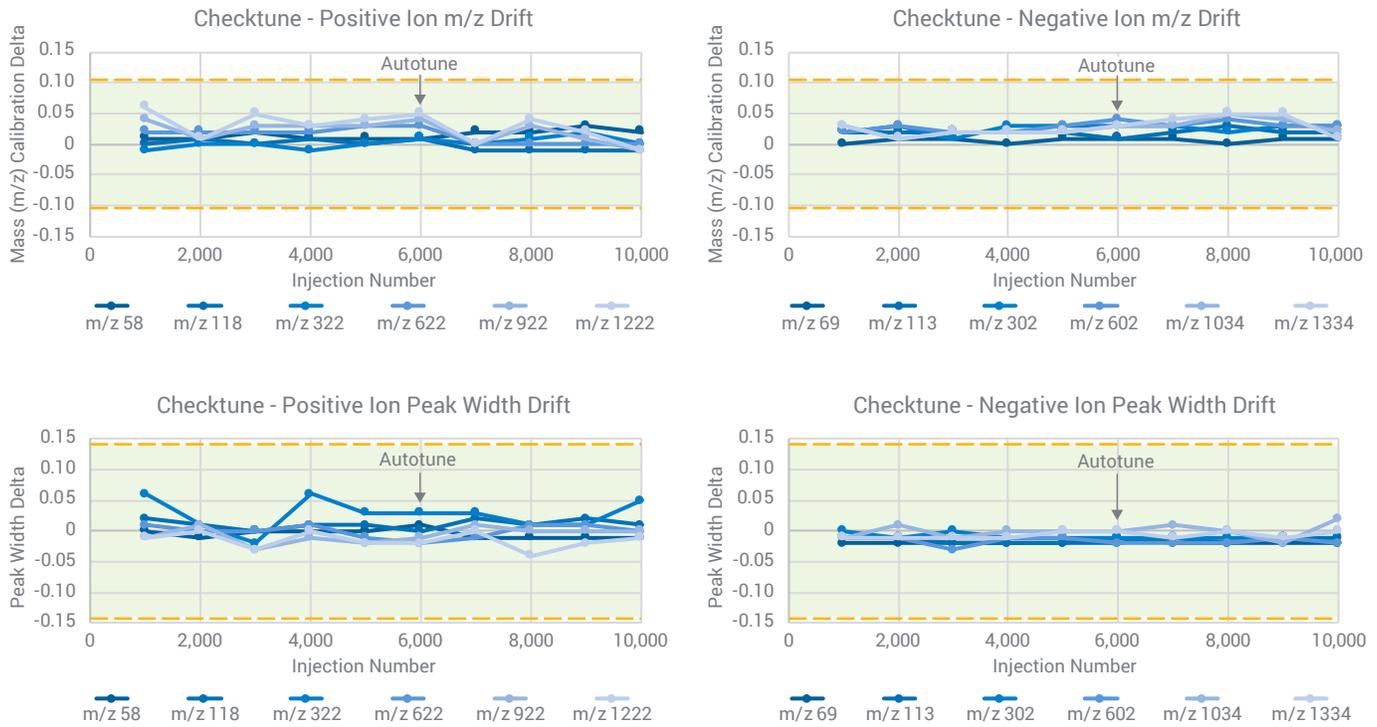


Figure 3: Checktune tolerance results performed every 1,000 injections.

MS Checktune Report - G6475A		
Instrument Information		
Model	G6475A	Checktune Date
Serial Number	SQ22228001	2022-09-25T16:08:08-07:00
Ion Source	AJS ESI	SWIFT Version
Last Autotune Date	2022-08-29T11:36:41-07:00	3.0.1424/8.1.34
Vacuum Pressure	2.25E+0 [Torr]; 2.90E-5 [H] (Torr)	Ionization Mode
		ESI
		Last Tuned By
		SYSTEM (SYSTEM)
		Overall Result
		Passed
Positive Ion Mode		
MS1 Peak Width Unit, Scan Speed Normal	Result	Passed
MS2 Peak Width Unit, Scan Speed Normal	Result	Passed
MS1 Peak Width Narrow, Scan Speed Normal	Result	Passed
MS2 Peak Width Narrow, Scan Speed Normal	Result	Passed
MS1 Peak Width Wide, Scan Speed Normal	Result	Passed
MS2 Peak Width Wide, Scan Speed Normal	Result	Passed
MS1 Peak Width Widest, Scan Speed Normal	Result	Passed
MS2 Peak Width Widest, Scan Speed Normal	Result	Passed
MS2 Scan Speed Fast	Result	Passed
MS2 Scan Speed Ultra	Result	Passed
MS1 Lag Factor	Result	Passed
MS2 Lag Factor	Result	Passed
Gain	Result	Passed
Negative Ion Mode		
MS1 Peak Width Unit, Scan Speed Normal	Result	Passed
MS2 Peak Width Unit, Scan Speed Normal	Result	Passed
MS1 Peak Width Narrow, Scan Speed Normal	Result	Passed
MS2 Peak Width Narrow, Scan Speed Normal	Result	Passed
MS1 Peak Width Wide, Scan Speed Normal	Result	Passed
MS2 Peak Width Wide, Scan Speed Normal	Result	Passed
MS1 Peak Width Widest, Scan Speed Normal	Result	Passed
MS2 Peak Width Widest, Scan Speed Normal	Result	Passed
MS2 Scan Speed Fast	Result	Passed
MS2 Scan Speed Ultra	Result	Passed
MS1 Lag Factor	Result	Passed
MS2 Lag Factor	Result	Passed
Gain	Result	Passed

The screenshot shows the 'Maintenance' window with several sections:

- Early Maintenance Feedback Counters:** Includes 'Autotune' (Enabled, Alert threshold 31 days, Expires 04-Jun-2022) and 'Checktune' (Enabled, Alert threshold 7 days, Expires 13-May-2022).
- Injection count:** Alert threshold 10000, Remaining (Counts) 972.
- Divert valve switches:** Alert threshold 10000, Remaining (Counts) 9894.
- Rough pump:** Alert threshold 365 days, Expires 13-Apr-2023.
- Gas filter:** Alert threshold 365 days, Expires 13-Apr-2023.
- Detector health:** Detector lifetime remaining (%) 94.8%.
- Other indicators:** Nebulizer status, Capillary status, and Spray stability status, all shown as green bars indicating they are within normal limits.

Figure 4: Checktune report results demonstrating that all parameters pass (left) and Early Maintenance Feedback letting the user know that the instrument has exceeded 10,000 injections (right).

## Conclusions

- Instrument robustness over 10,000 injections was demonstrated using a heavy matrix (bovine urine) sample.
- Checktunes were recorded to verify instrument stability. Tune ion Mass Calibration and Peak Widths were recorded every 1,000 injections and were within tolerance criteria for good performance.
- Nebulizer spray, ion injector capillary, and spray stability triggered no adverse events.
- Constant ion bombardment through MRM acquisition did not age the detector in a significant manner.

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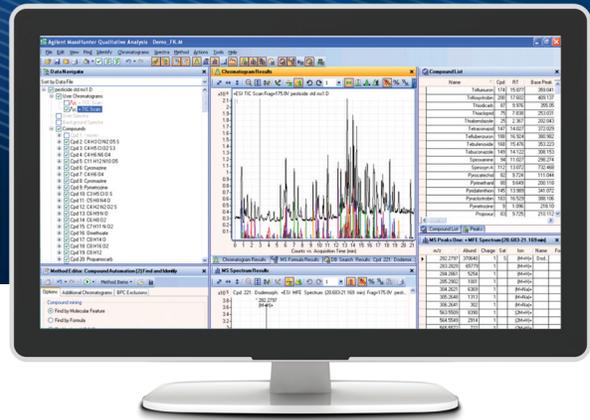
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TS 57 Agilent MassHunter takonjori programine (ranga)

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TS 5.7.1 Agilent MassHunter programinė įranga skirta Agilent LC/MS sistemos funkcijų valdymui, duomenų kaupimui ir analizavimui.

*"The software is very, very user-friendly. Step-by-step, I learned quite easily on my own. So many possibilities to give meaning to my data. And all of them are efficient and powerful, and help me to get some nice conclusions on the hypotheses I have made at the outset."*

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**DR. NICOLAS TAYLOR**, LC/MS USER, MOLECULAR ACCLIMATION LABORATORY, ARC CENTRE OF EXCELLENCE IN PLANT ENERGY BIOLOGY, UNIVERSITY OF WESTERN AUSTRALIA

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*"We work with QC analyses that involves tracking 40 parameters, looking at a sequence of 10 samples at a time... before, we had to go sample by sample, data file by data file to evaluate the sequence... Now, with MassHunter, we have created one customized overview screen that enables us to scroll parameter by parameter all the QCs for the full sequence very quickly."*

**DR. ARMAND VERBUEKEN**, GC/MS USER, BAYER, ANTWERP, BELGIUM ENVIRONMENTAL TESTING LAB

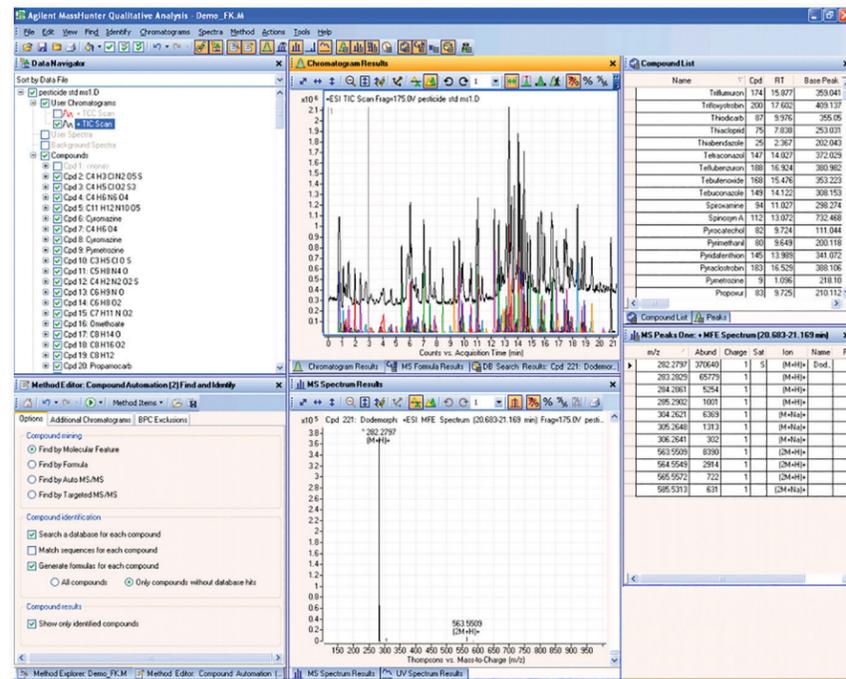
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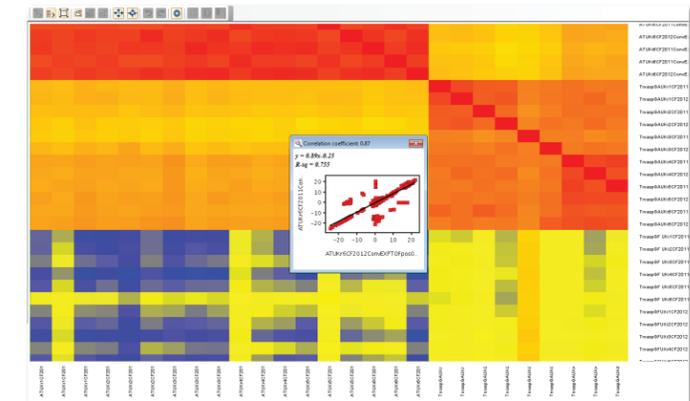
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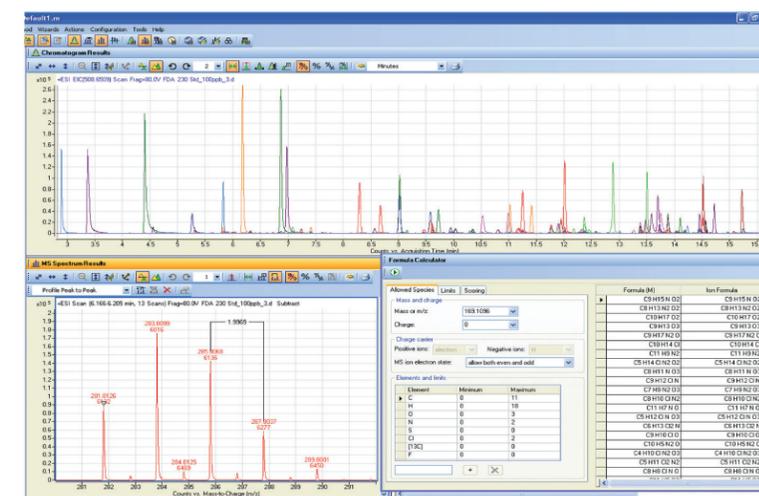
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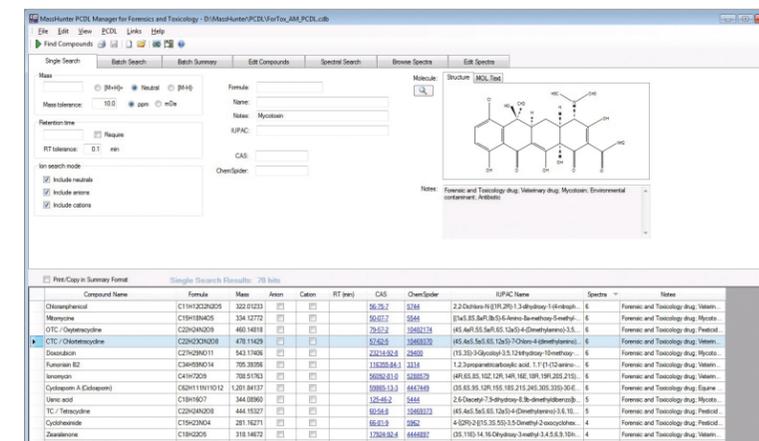


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- Mycotoxins PCDL
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- METLIN database

Agilent MassHunter Qualitative Analysis software supports peak finding of GC/MS data files, and compound identification via library matching.

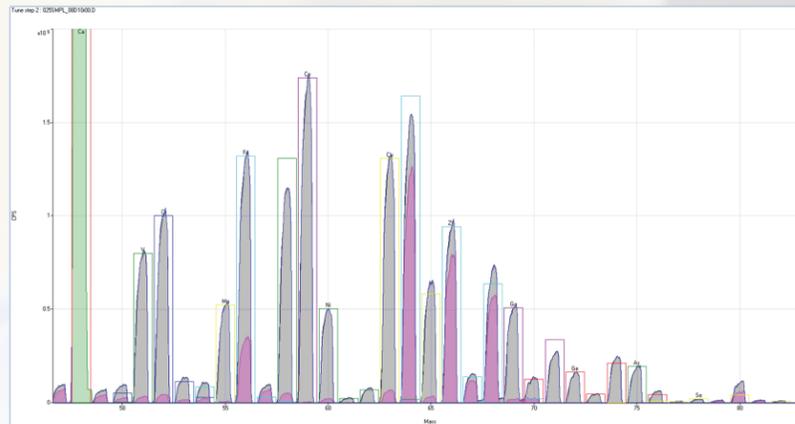


Agilent's Mycotoxins PCDL ensures fast, customized method development.

## MASSHUNTER EASES YOUR ICP-MS WORKFLOW

### ICP-MS MassHunter Workstation for comprehensive control and analysis

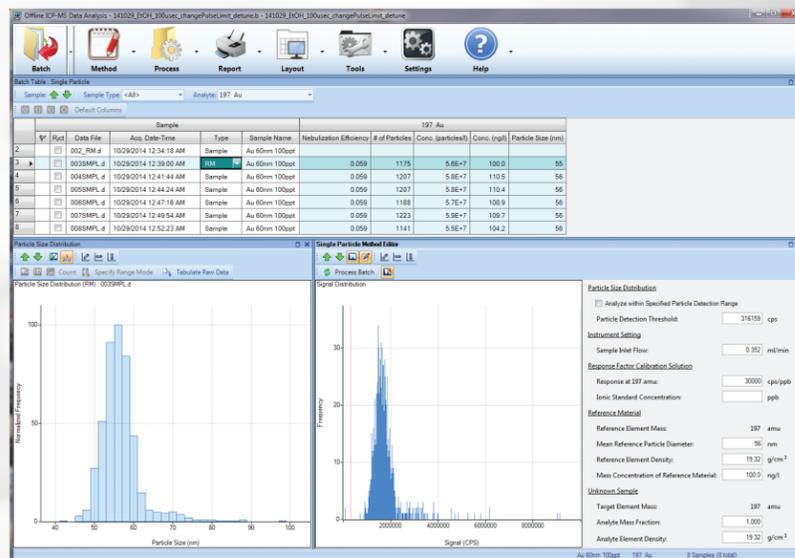
MassHunter software for ICP-MS includes complete instrument control, acquisition, and data analysis modules for stand-alone ICP-MS, as well as for hyphenated systems including HPLC and GC sample introduction. LabQC provides automatic flagging of outliers in quantitative analysis. Isotope ratio determination and time-resolved analysis are standard features, with optional modules that provide advanced functions such as real-time Intelligent QC, advanced chromatographic data analysis, and integration with Agilent OpenLAB Enterprise Content Manager.



Powerful qualitative and semi-quantitative ICP-MS data analysis. ICP-MS MassHunter Workstation provides comprehensive spectral processing tools for evaluating, comparing, and reporting information on uncalibrated analytes.

### MassHunter single nanoparticle application mode

The fully integrated Agilent nanoparticle application module incorporates the entire process of nanoparticle determination into ICP-MS MassHunter software. The method wizard guides you through the automated creation of new nanoparticle methods for Agilent 7900 ICP-MS and 8800 Triple Quadrupole ICP-MS, and supports data acquisition in both FFF-ICP-MS and single nanoparticle modes. With a few mouse clicks, a complete analytical method, including optimized acquisition parameters, reference material values, and data analysis parameters, is set up and ready to run. The familiar "Batch at a Glance" table summarizes reference material and sample results for an entire batch. Paper or electronic reports including all data and graphics are automatically generated.



Nanoparticle application module final batch results are reported in tabular and graphical formats. Tab through individual samples in the table and review individual graphical results with powerful optimization tools.

### OpenLAB—Agilent software gets you to the answers faster

MassHunter is part of Agilent's comprehensive, integrated OpenLAB software portfolio. From instrument control to enterprise content management, we recognize the critical role software plays in your lab's operation. We're working towards a single goal: to help you reduce the time, effort, and cost to get from raw data to final insight.

### Other MassHunter literature:

Qualitative add-on modules:  
 MassHunter Profiler Professional (MPP): 5990-4164EN  
 Pathway Architect: 5991-1459EN  
 Mass Profiler: 5991-5511EN  
 Spectrum Mill: 5991-5250EN  
 MassHunter and Skyline Integration: 5991-5248EN  
 MassHunter Walkup: 5991-3836EN  
 MassHunter BioConfirm: 5991-3643EN

### Databases and PCDLs

METLIN: 5990-7854EN  
 Mycotoxins PCDL overview: 5991-5691EN  
 GC Q-TOF Pesticides PCDL Application Kit: 5991-5021EN  
 All Ions MS/MS: Targeting screening and quantitation using Agilent TOF and Q-TOF LC/MS (technical overview): 5991-2465EN

## Microsoft Office Home & Student 2021 - Licence - 1 PC/Mac - Download - ESD - National Retail - Win, Mac - All Languages - Eurozone



Microsoft

Prekės Nr.: 79G-05339

TS 5.8 Microsoft Office paketas

### Specifikacija

#### General

Category	Office applications - office suite
Product Type	Licence
Platform	Windows, MacOS
Software Suite Components	Microsoft Excel, Microsoft Powerpoint, Microsoft Word
Distribution Media	Download
Language	All Languages
Localisation	Eurozone

#### Licencing

Licence Qty	1 PC/Mac
Details	National Retail - ESD

Your Essential Resource for

# INFINITYLAB LC SUPPLIES

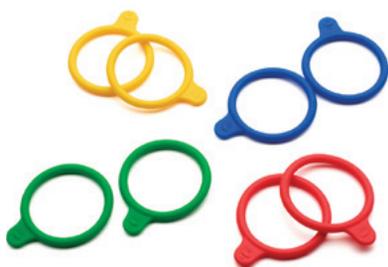




InfinityLab solvent bottle, clear, 1 L, 9301-6528



InfinityLab solvent bottle, amber, 1 L, 9301-6526



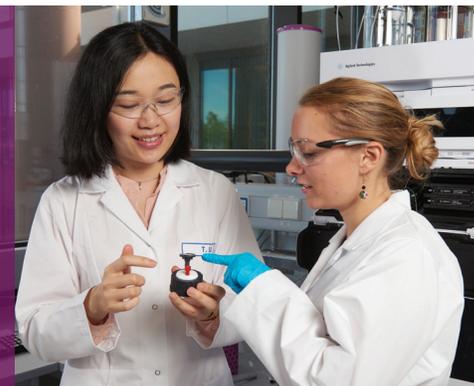
InfinityLab identification silicone rings, 8/pk, 9301-6529

### Solvent Reservoir and General Supplies

Description	Comments	Part No.
Standard bottle cap, with 3-hole insert		5063-6531
InfinityLab solvent bottle, clear, 1 L	93 mm diameter, 253 mm height, GL45 thread	9301-6524
<u>InfinityLab solvent bottle, clear, 1 L, with cap</u>	<u>93 mm diameter, 253 mm height, GL45 thread</u>	<u>9301-6528</u>
InfinityLab solvent bottle, amber, 1 L	93 mm diameter, 253 mm height, GL45 thread	9301-6526
InfinityLab solvent bottle, clear, 500 mL, with cap	78 mm diameter, 195 mm height, GL45 thread	9301-6523
InfinityLab solvent bottle, amber, 500 mL, with cap	78 mm diameter, 195 mm height, GL45 thread	9301-6525
InfinityLab solvent bottle, clear, 125 mL, with cap	GL45 thread	9301-6527
Solvent bottle, clear, 2 L, 2 inlets	GL45 thread	5065-4421
Solvent bottle, amber, 2 L	GL45 thread	9301-6341
Solvent bottle, clear, 2 L	GL45 thread	9301-6342
InfinityLab identification silicone rings, 8/pk	Four colors	9301-6529
Sticker, for solvent bottles, 100/pk	Removable	9301-6530
Bottle head tubing, ultra clean quality (recommended for MS application)	Includes set of clips for marking the various channels, and solvent tubes, 2280 mm long, with premounted fittings on one side (1/4-28), 4/pk	5043-1789
Bottle head tubing	Includes set of clips for marking the various channels, and solvent tubes, 2280 mm long, with premounted fittings on one side (1/4-28), 4/pk	5043-1790
<b>Bottle Head Assembly</b>		
Bottle head assembly, for screw bottle	For 1100/1200/1260 series systems	G1311-60003
Bottle head assembly	For 1260 Infinity II, 1290 Infinity/Infinity II LC	G7120-60007
Bottle head assembly, extra long (2280 mm)		G7122-60007
Bottle head assembly, ultra clean tubing quality	Recommended for MS applications, 1290 Infinity/Infinity II LC	G7120-60017
Tubing kit, ultra clean quality	Recommended for MS applications, includes bottle head assemblies (G7120-60017, 4/pk), and tubing kits, 140 mm (G4220-60070, 3/pk)	G7120-68070
Tubing kit, 140 mm, 2/pk	SSV to shutoff valve or degassing unit (binary pump), degasser to MCGV (quaternary pump)	G4220-60035
Tubing kit, 140 mm, 2/pk, ultra clean tubing quality	Recommended for MS applications	G4220-60070
Bottle head assembly, for prep system	4.7 mm od tubing	G1361-60022

TS 5.9. 2. 1 l talpo mobilios fazės talpos su specialiais kamščiais, 10 vnt.

# Solvent Waste Containers: Safely Capture Hazardous Chemicals



TS 5.9. 3. Atliekų surinkimo talpa skirta skystųjų chromatografinės sistemos atliekoms surinkti

InfinityLab solvent waste containers provide a convenient way for your LC solvent waste to be contained.

## InfinityLab charcoal filter (58 g)

Six-month time strip tells you when the filter needs to be replaced.

TS 5.9. 3. Atliekų surinkimo talpa su filtru, absorbuojančiu į atliekas patekusių tirpiklių garus. Filtras turi indikatorius, nurodantį kada reikalingas filtro pakeitimas nauju.

## Leak hose

Connects system leak tubing.

## InfinityLab Stay Safe cap

Stops solvents from leaching into the air.

## InfinityLab fittings

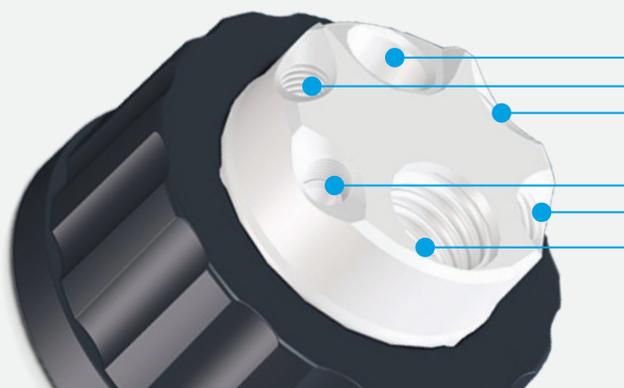
Enable vapor-tight tubing connections.

## InfinityLab waste can



TS 5.9. 3. Atliekų surinkimo talpa su specialiu kamsčiu prijungiančiu sistemos atliekų nutekėjimo žarneles

## Ports for solvent waste containers



Leak hose port (1/8"-27 NPT thread)

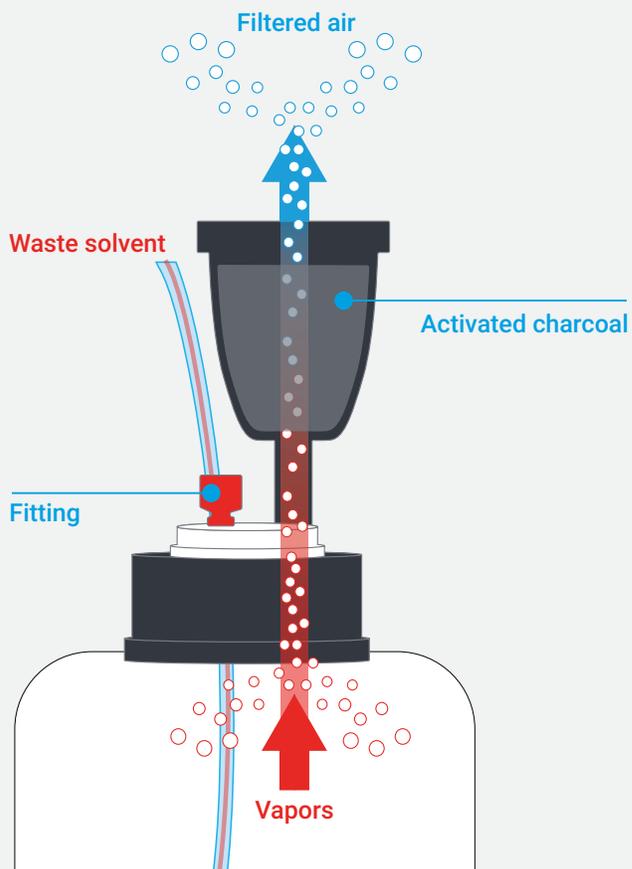
Fitting ports (1/4"-28 UNF thread)

Charcoal filter port (GL14)

TS 5.9. 3. Atliekų surinkimo talpa su filtru, absorbuojančiu į atliekas patekusių tirpiklių garus. Filtras turi indikatorius, nurodantį kada reikalingas filtro pakeitimas nauju.

### Charcoal filter: keep solvent vapors at bay

The Agilent InfinityLab charcoal filter absorbs the harmful solvent vapors coming from the waste container, ensuring clean air.



### Installation

Installing an InfinityLab charcoal filter is fast and easy.

1. Identify the connecting port on the cap. Note: The charcoal filter can only be used on the Stay Safe cap GL45 with 4 ports (p/n 5043-1220).
2. Install the charcoal filter on the connecting port and turn clockwise until you feel a resistance.



## Certified Screw Top Vials and Closures

Combine the excellent autosampler handling of a crimp cap profile with the ease of a screw cap. The screw caps and precision fit septa give a secure seal with microvolume inserts.

- Certified for full warranted compatibility with Agilent autosamplers
- 2 mL, 12 x 32 mm, 9 mm diameter **TS 5.9. 4. 100 vnt. chromatografinių buteliukų, 2 ml talpos**
- Packaged in a unique box designed to reduce vial breakage
- 40% larger opening than standard narrow opening vials
- Unique thread design for consistently secure seal
- Precision-formed neck for optimal robotic arm handling
- Rigorous quality assurance for dimensional consistency from lot-to-lot
- Optional ceramic write-on spot with fill marks



### 2 mL Wide Opening Screw Top Glass Vials

Description	100/pk	1000/cs*
Clear	5182-0714	5183-2067
Clear, write-on spot	5182-0715	5183-2068
Amber	5188-6535	5188-6536
<u>Amber, write-on spot</u>	<u>5182-0716</u>	5183-2069
<b>Deactivated Vials</b>		
Clear	5183-2070	
Clear, write-on spot	5183-2071	
Amber, write-on spot	5183-2072	

**TS 5.9. 4. 100 vnt. chromatografinių buteliukų, 2 ml**

\*Case includes 10 packs of 100 vials

### LC Vials and Closures

Description	Unit	Part No.
<b>6 mL Screw Top Vials and Closures</b>		
Clear, flat bottom	100/pk	9301-1377
Screw caps, 16 mm	100/pk	9301-1379
PTFE/silicone septa	100/pk	9301-1378
PTFE/silicone septa, pre-slit	100/pk	5188-2758
<b>5 mL Screw Top Vials</b>		
Clear, high recovery	30/pk	5188-5369



PTFE-lined solid top screw caps for 2 mL vials, 5183-2075



Polypropylene caps with bonded septa, 5185-5823



Screw caps with septa

**Screw Caps for 2 mL Vials** TS 5.9. 4. Chromatografinių butelių kamščeliai, 100 vnt.

Color	Septa Type	Certified	100/pk	500/pk	1000/pk
Blue	PTFE/red silicone septa	✓	5182-0717	5185-5820	5190-1599
	PTFE/white silicone septa	✓	5182-0720	5185-5863	
	PTFE/silicone/PTFE septa	✓	5182-0723	5185-5862	
	Pre-slit PTFE/silicone septa	✓	5183-2076	5185-5865	
	PTFE-lined solid top	✓	5183-2075		
	Open top, no septa	✓	5182-0728		
	Bonded PTFE/silicone septa		5185-5823		
	Bonded pre-slit PTFE/silicone septa		5185-5824	5040-4649	
Green	PTFE/red silicone septa	✓	5182-0718	5185-5829	
	PTFE/white silicone septa	✓	5182-0721	5185-5864	
	PTFE/silicone/PTFE septa	✓	5182-0724	5185-5861	
	Pre-slit PTFE/silicone septa	✓	5183-2077		
	Open top, no septa	✓	5182-0727		
Red	PTFE/red silicone septa	✓	5182-0719		
	PTFE/white silicone septa	✓	5182-0722		
	PTFE/silicone/PTFE septa	✓	5182-0725		
	Pre-slit PTFE/silicone septa	✓	5183-2078		
	Open top, no septa	✓	5182-0726		
Black	PTFE/red silicone septa	✓	5185-5838		
Purple	PTFE/silicone septa	✓	5040-4681		
Light turquoise	PTFE/silicone septa	✓	5040-4683		

**Certified Septa for Wide Opening (9 mm) Screw Caps**

Septa Type	Color	100/pk
PTFE/red silicone	Ivory	5182-0731
PTFE/white silicone/red PTFE	Red	5182-0729
Pre-slit PTFE/white silicone	Blue	5183-2074
PTFE/white silicone	Red	5182-0730

**Screw Cap Pack for 7696 Sample Prep Workbench**

Description	Septa Type	Part No.
Multicolor screw cap pack Includes 50/pk of each color: blue, green, red, light turquoise, purple	PTFE/silicone septa	5040-4682

## Agilent CrossLab Start Up Services

# Agilent G6475A and 6495D LC/TQ Site Preparation Checklist

Thank you for purchasing an instrument from **Agilent Technologies**. CrossLab Start Up is focused on helping customers shorten the time it takes to start realizing the full value of their instrument investment.

Correct site preparation is the key first step in ensuring that your instruments and software systems operate reliably over an extended lifetime. This document is an **information guide and checklist** prepared for you that outlines the supplies, space, and utility requirements for the system set up in your lab.

- Use the correct power cord. For more information regarding power cords, please see the [LC/MS Site Preparation Guide](#) also available on Agilent.com or see the Power Cord section..

## Required Operating Supplies by Customer for Installation

### Main Nitrogen Gas Supply Requirements

- Impurities from LN<sub>2</sub> Dewar being oxygen only
- "Hydrocarbon free" means < 0.1 PPM hydrocarbons with the remaining gas being oxygen and trace argon.
- Nitrogen Pressure as measured at the LC/MS inlet (not the supply side).
- Minimum Nitrogen Flow is required at all times to prevent air from entering the instrument.
- Main Nitrogen Supply fittings are 1/4" Swagelok.

Model	Nitrogen Source	Nitrogen Purity	Pressure	Flow
<u>G6475A LC/TQ</u>	LN <sub>2</sub> Dewar	≥ 99.5% and hydrocarbon free	<u>5.5 - 6.8 bar</u> (80 - 100 PSI)	≥ 30 L/min <u>Maximum</u> (≥ 1800 L/hour) > 3 L/min Minimum
	<u>N<sub>2</sub> Generator</u>	<u>≥ 95.0% and hydrocarbon free</u>		
G6495D LC/TQ	LN <sub>2</sub> Dewar	≥ 99.5% and hydrocarbon free	5.5 - 6.8 bar (80 - 100 PSI)	≥ 50 L/min Maximum (≥ 3000 L/hour) > 9 L/min Minimum
	N <sub>2</sub> Generator	≥ 95.0% and hydrocarbon free		

TS 5.9. 5. Siūlomos LC-MS/MS sistemos reikalavimai azoto generatoriui

### Collision Cell Nitrogen Gas Supply Requirements

- Nitrogen is the only supported Collision Cell gas.
- Splitting the Main Nitrogen Gas supply for use with the collision cell is not supported due to nitrogen purity requirements.
- Collision Cell gas supply fittings are 1/8" Swagelok.

Model	Nitrogen Source	Nitrogen Purity	Pressure	Flow
G6475A LC/TQ G6495D LC/TQ	High Pressure Cylinder	≥ 99.999% and hydrocarbon free (< 0.1 PPM hydrocarbons)	1 - 2 bar (15 - 30 PSI)	≥ 0.001 L/min (≥ 0.06 L/hour)

### Special notes

- For information on Agilent LC/TQ consumables, accessories, and laboratory operating supplies, please visit: [Agilent Triple Quadrupole LC/MS Supplies Quick Reference Guide](#)
- For nitrogen gas regulators and gas fitting purchasing options, visit [Gas Cylinder Supplies](#) and [GC Fittings](#) on Agilent.com.

## Special Requirements and Other Considerations

### Waste liquid and gas management

- Ensure the liquid waste containers are placed in secondary containers
- Agilent Infinity II [Stay Safe Cap](#) with [Charcoal Filter](#) recommended for large waste containers
- For recommended compatible nitrogen generators, contact your local sales representative.

### Tools

Your Agilent instrument comes with a few basic tools and consumables which are relevant to the specific configuration of your system.

#### *Tools (provided)*

- Capillary Puller Tool
- InfinityLab System Toolkit
- LC/MS Toolkit

# Genius XE Nitrogen

High performance nitrogen generator for LC-MS



Your local **gas generation** partner

## Description

Inspired by the success of our best-selling Genius line of nitrogen gas generators for LC-MS, Genius XE Nitrogen is a cutting-edge evolution combining advanced technology with refined and robust engineering. With two models - XE 35 (up to 35 L/min) and XE 70 (up to 70 L/min) - Genius XE Nitrogen provides a premium standalone nitrogen solution for high performance LC-MS and other mission-critical laboratory applications where performance and reliability are paramount.

Featuring **Multi-Stage Purification™** and next-generation integrated compressors with **Electronic Compressor Optimization™** (ECO) technology, Genius XE delivers factory certifiable purity up to 99.5% on-demand, 24/7 with a convenient fixed annual service interval.

## Applications

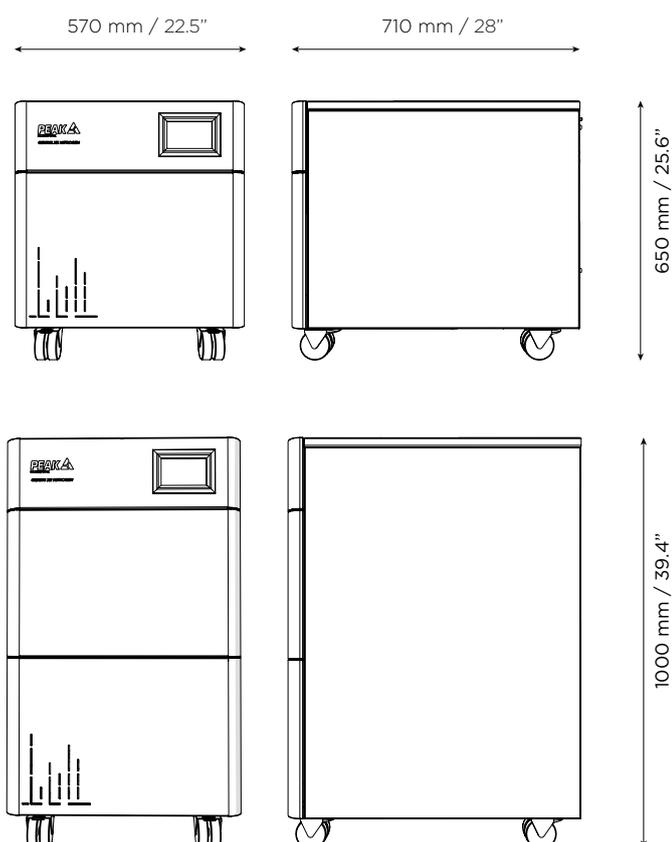
On-demand nitrogen source for:

- LC-MS including new high-sensitivity instruments
- ELSD
- Small sample evaporators
- Other laboratory applications requiring nitrogen



## Key Features

- Variable flow up to 70 LPM
- Variable pressure up to 116 psi
- Multi-Stage Purification™ producing analytical grade nitrogen gas up to 99.5% purity
- 2 year comprehensive manufacturer's warranty\*
- Touch-screen full colour user interface for ease of operation
- ECO (Electronic Compressor Optimisation™) technology for low energy consumption and compressor durability
- Next-generation high performance premium compressors, engineered exclusively for Genius XE
- Smaller & quieter than previous generation of Genius
- On-board service scheduling and system diagnostics
- Additional compressor capacity for lower flow applications (XE 70 only)



Technical Specifications	Genius XE 35	Genius XE 70
Max Flow Rate	up to 35 L/min	up to 70 L/min
Max Pressure	116 psi (8 bar)	116 psi (8 bar)
Gas Outlets	1 x ¼" BSPP	1 x ¼" BSPP
Purity**	95-99.5%	95-99.5%
Max Relative Humidity	80% RH @ 31°C	80% RH @ 31°C
Max Altitude	3000m	3000m
Particles	< 0.01 µm	< 0.01 µm
Phthalates	Phthalate & BHT Free	Phthalate & BHT Free
Suspended Liquids	None	None
Non-Methane Hydrocarbon Content	< 1 ppm NMHC	< 1 ppm NMHC
Operating Temperature	5°C (41°F) to 35°C (95°F)	5°C (41°F) to 35°C (95°F)
Electrical Requirements	120VAC, 60Hz, 12A or 230VAC, 50/60Hz, 8A	230VAC, 50/60Hz, 12A
Power Consumption	960 VA (120V)/1265 VA (230V)	2530 VA
Heat Output	4118 BTU	8785 BTU
Noise Level†	56 dB	59 dB
Generator Dimensions (H x W x D)	650 x 570 x 710 mm 25.6 x 22.5 x 28 "	1000 x 570 x 710 mm 39.4 x 22.5 x 28 "
Generator Weight	92 kg / 202 lbs	147 kg / 325 lbs

Ordering Information		
Part Number	3300252 (230VAC) /3300807 (120VAC)	3300253
Annual Service	<b>visit:</b> <a href="http://www.peakscientific.com/ordering">www.peakscientific.com/ordering</a>	
Complete Maintenance Plan		

\*\* Factory certified purity with respect to O2 content. Actual purity varies in relation to flow (min. 95% at maximum flow output)

† Noise level expressed as SPL (Sound Pressure Level) measured at 1m from source in a reverberant chamber

## [PEAK Protected]™

Peak Scientific gas generators define the benchmark in reliability, convenience and performance in laboratories around the world, and come backed by a 2 year warranty\*. Beyond this period however you can ensure that your investment continues to be **[Protected]** by our comprehensive generator care cover.

Our world-class aftercare support packages deliver a program of scheduled preventative maintenance whilst giving you the reassurance of instant access to worldwide technical support and priority on-site response in the untimely event of a breakdown.

**\*Year 2 of warranty subject to generator being serviced at end of year 1 by a Peak-approved agent in accordance with fixed annual maintenance schedule.**

**For full terms and conditions visit [www.peakscientific.com/warranty-statement](http://www.peakscientific.com/warranty-statement)**

Peak Scientific UK  
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Fax: +44 (0)141 812 8200

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Tel: +1 866 647 1649  
Fax: +1 978 608 9503

For a full list of our worldwide office locations, please visit: [www.peakscientific.com/offices](http://www.peakscientific.com/offices)

Web: [www.peakscientific.com](http://www.peakscientific.com)  
Email: [discover@peakscientific.com](mailto:discover@peakscientific.com)

Peak Scientific's Quality Management System conforms to:  
ISO 9001:2015



FM 515973

### Product Certifications



# Collision Gas Add-On

Part number: 3304886



## Description

TS 5.9. 6. Su siūlomu azoto generatoriumi suderinamas priedas skirtas aukšto grynumo dujoms generuoti LC-MS/MS susidūrimų celei

Designed to work exclusively with Genius XE 35 and Genius XE 70, our Collision Gas Add-On supplies Ultra High Purity Nitrogen to the collision cell at a flow of up to 200cc/min.

With a set purity of 99.999%, the Collision Gas Add-On produces a high quality flow with no reduction to the output of the Genius XE generator. The Collision Gas Add-On allows labs to draw nitrogen from their Genius XE 35 or Genius XE 70 which removes the need for gas cylinders for UHP nitrogen.



## Application Types

- Thermo Orbitrap
- Agilent Q-TOF
- Agilent 6560
- Waters Xevo TQ Absolute

## Generator Details

- **Gas types:** Nitrogen
- **Integrated compressor:** No

TS 5.9. 6. Su siūlomu azoto generatoriumi suderinamas priedas skirtas aukšto grynumo dujoms generuoti LC-MS/MS susidūrimų celei

## Key Features

- Can be used to supply Ultra High Purity Nitrogen for the collision cell - 99.999% nitrogen at 200cc/min\*
- Designed to be used alongside a Genius XE 35 or XE 70, creating a dual purity system
- HMI Screen – monitor the performance of the Collision Gas Add-On
- Maintenance interval every year, down time minimized as service can be performed at same time as Genius XE
- No risk of running out of gas in the middle of analysis
- 2 year comprehensive manufacturer's warranty

\*Nitrogen generator providing main gas source to an instrument.  
(Genius XE 35 or XE 70 systems)



## Technical Specifications

	Collision Gas Add-On
Gas Type	Nitrogen
Max Gas Flow:	<u>200cc/min</u>
Max Output Pressure:	<u>80psi/5.5bar</u>
Max Output Pressure:	80psi/5.5bar
Max Purity:	<u>99.999%</u>
Gas Outlets Fitting:	1 x 1/4" BSPP
Min Air Inlet Flow:	4 L/min
Power Consumption:	20W @ 100VAC / 48W @ 240VAC
Voltage:	100v - 240v
Frequency:	50/60 Hz
Current:	0.2A
Max Operating Temp:	35°C / 95°F
Particles:	<0.01µm
Noise Level:	Silent in operation
Size (HxWxD) mm	165 x 360 x 425 mm
Size (HxWxD) Inches	6.5 x 14.2 x 16.7 inches
Generator Weight	14kg / 30.8lbs

# [PEAK Protected]<sup>TM</sup>

Peak Scientific gas generators define the benchmark in reliability, convenience and performance in laboratories around the world, and come backed with a 2 year warranty. Beyond this period however you can ensure that your investment continues to be **[Protected]** by our comprehensive generator care cover.

Our world-class aftercare support packages deliver a program of scheduled preventative maintenance whilst giving you the reassurance of instant access to worldwide technical support and priority on-site response in the untimely event of a breakdown.

- For ordering parts visit: [www.peakscientific.com/ordering/](http://www.peakscientific.com/ordering/)
- For service plans visit: [www.peakscientific.com/service/service-plans/](http://www.peakscientific.com/service/service-plans/)

**Peak Scientific UK**  
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Fax: +1-978-608-9503

**Peak Scientific China**  
Tel: +86 21 5079 1190  
Fax: +86 21 5079 1191  
For a full list of our worldwide office locations, please visit:  
Web: [www.peakscientific.com](http://www.peakscientific.com)  
Email: [discover@peakscientific.com](mailto:discover@peakscientific.com)

Peak Scientific's Quality Management System conforms to: ISO:9001

