

1200 Infinity Series

The Agilent 1200 Infinity LC Series

Introduction and Overview



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1220
Infinity LC

1260
Infinity LC

1290
Infinity LC

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1200 Infinity Series

The **NEW** Agilent 1200 Infinity Series

Raising the Standard in HPLC –
Highest Value for any
Application and
Budget

1220 Infinity
Infinitely more affordable



1260 Infinity
Infinitely more flexible



1290 Infinity
Infinitely more powerful



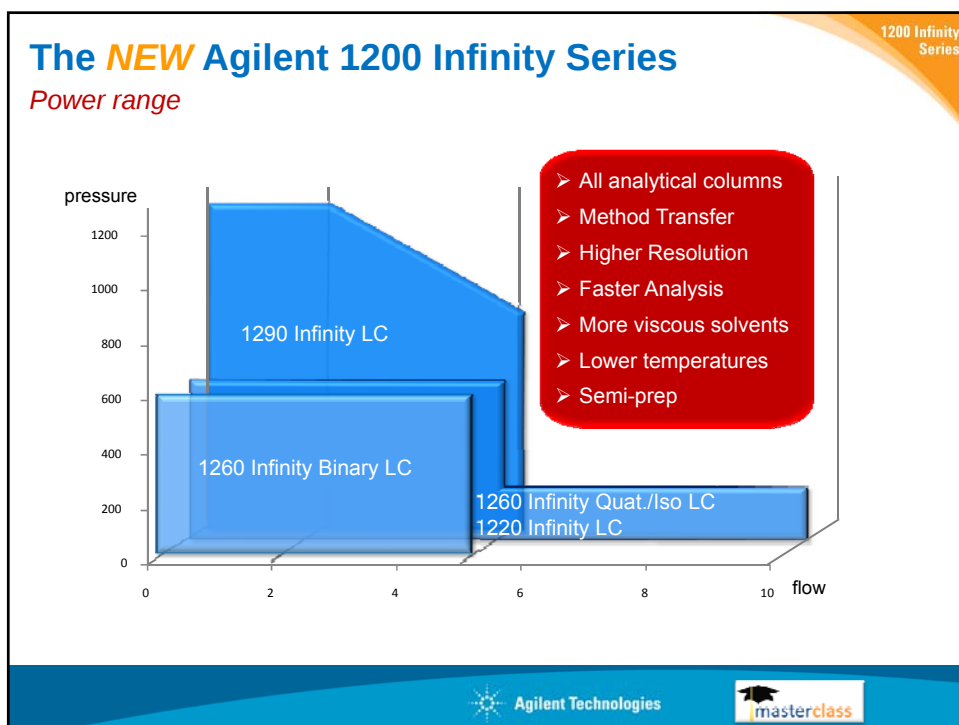
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NEW Agilent 1200 Infinity Series
Raising the Standard in HPLC – UHPLC for EVERY Lab

1200 Infinity Series

 1220 Infinity LC Integrated 600 bar 80 Hz Most affordable HPLC and UHPLC 1260/1290 Technology	 1260 Infinity LC Modular 600 bar 80 Hz 2x or 10x UV Sensitivity 100% HPLC Compatible HPLC Price – UHPLC Capability	 1290 Infinity LC Modular 1200 bar 160 Hz Highest Performance Highest Flexibility Low Cost of Ownership
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NEW: 1220 Infinity LC

Isocratic and Gradient RRLC at most affordable Price



1200 Infinity Series



Most affordable access to 1260 Infinity Quality & Performance



- Available flavors:
 - 1220 Infinity manual isocratic system (upgradable)
 - 1220 Infinity manual binary gradient system (upgradeable)
 - 1220 Infinity automated binary gradient system
 - 1220 Infinity automated binary gradient with DAD!
- Productivity: **10x higher than conventional HPLC systems**
 - **600 bar** up to 5 mL/min (10 mL/min at 200 bar)
 - **80 Hz** detector speed
- Technology and Quality: **1260 and 1290 Infinity inside!**
 - Degassing: Same Technology/Parts as 1290 Bin/1260 Quat degasser
 - Pump: Same Technology/Parts as 1260 Quat Pump (2-channel)
 - Autosampler: Same Technology/Parts as 1260 ALS (no cooling)
 - VWD/DAD: Same Technology/Parts as 1260/1290 VWD
- Price: markedly below 1260 Infinity Isocratic / Quaternary Systems



NEW: 1260 Quaternary LC System

Enhanced Quaternary RRLC at Quaternary HPLC Price

1200 Infinity Series



Evolution of the best-selling 1200/1100 Series Quat LC*

- Productivity: **10x higher than 1200/1100 Quaternary HPLC**
 - **600 bar** up to 5 mL/min (10 mL/min at 200 bar)
 - **80 Hz** Detector Speed
- Sensitivity:
 - Up to **10x higher than 1200/1100 Quaternary HPLC**
 - 10x by new 1260 Infinity DAD with 6 cm flow cell ($\pm 0.6 \mu\text{AU}$)
 - 2x by new 1260 Infinity VWD and 1260 Infinity DAD with 1cm flow cell
- Technology: Leverage of **1290 Infinity LC** innovations
 - Pump: New, build-in degassing unit and next generation inlet valves
 - Detectors: Next generation VWD and DAD-technology
- Price: Similar as 1200 Series Quat (400 bar, 20 Hz, $\pm 6 \mu\text{AU}$)

*) 60,000 systems sold!



NEW: 1260 Infinity Bio-inert HPLC

Infinitely Better for Bio-molecule Analysis

1200 Infinity Series

**BIO
inert**



100% Bio-inert

- Metal-free sample flow path (instrument and column)
- Stainless steel-free solvent flow path
- **Widest pH range** (1-13, short-term 14)

10x sensitivity and 600 bar power range

- Lowest LOD and highest resolution per time
- From **lowest pressure** up to **highest pressure** STM columns
- Unique resolution for protein applications

Bio-analysis and Bio-purification

- Analytical flow and **semi-prep fraction coll.** up to 10 mL/min

Most complete offering for NBE Characterization

- Therapeutic protein analysis using SEC, IEX, peptide mapping

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NEW: 1260 Binary LC System

Enhanced Binary RRLC Capability at HPLC Price

1200 Infinity Series



Successor of the 1200 Series RRLC (1200 SL)

- Productivity:
 - Same as the highly successful 1200 Series RRLC – for 2.1 mm ID to 4.6 mm ID columns, by scalable delay-volume
- Sensitivity:
 - **10x higher** than 1200 Series RRLC by new 1260 Infinity DAD
- Autosampler-Performance:
 - <0.004 % carry-over and 100 µL injection by new 1260 Infinity High Performance Autosampler. 40 µL kit for delay volume reduction.
- Technology: Leverage of **1290 Infinity LC** innovations
 - Pump: New next generation inlet valves for better performance
 - Detectors: Next generation 1290 Infinity DAD.
 - HiP Autosampler: Same technology/parts as 1290 Infinity autosampler
- Price: Markedly lower than 1200 Series RRLC

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NEW: 1260 Infinity Analytical SFC System

Infinitely Better for Supercritical Fluid Chromatography

1200 Infinity Series



Makes routine analytical SFC a reality!

Highest Analytical SFC Performance

- **HPLC-like Sensitivity** (10x over existing instruments)
- Precision and Dynamic Range >10,000 for accurate quantitation of 0.01 % level impurities

Lowest Operating Cost, Green Chemistry

- **10-15x lower operating costs** by compatibility with **standard grade CO₂** instead of liquid SFC grade CO₂
- Lowest solvent consumption and waste generation

Ease of use and Reliability

- Highest investment protection by modular, reversible design
- ChemStation control, data analysis and reporting
- Agilent warranty and service quality
- Single Vendor Solution – Single Vendor Support

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The Agilent 1260 Infinity SFC/UHPLC Hybrid System

1200 Infinity Series



Two orthogonal techniques with a single system

Simply switch the valve

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1290 Infinity LC

More Affordable Access to the World's Best LC

1200 Infinity Series



NEW: UHPLC Productivity with HPLC Service Costs

- **Lowest UHPLC Cost of Ownership**
- Based on
 - proven robustness – 2x better than 1100 Series at introduction
 - Increased parts lifetime / longer maintenance intervals
 - new design-for-supportability technology for faster maintenance, diagnostics and repair
- Technology:
 - **1200 bar up to 2 mL/min (5 mL/min at 800 bar)**
 - **160 Hz Detector Speed**
 - **Highest detector sensitivity** on the market (0.6 μ AU/cm noise level)
 - **Lowest autosampler carry-over** (<0.001 %, <10 ppm for UV and MS detection in combination with 1290 Infinity Flexible Cube)
 - New **high-capacity** solution for highest throughput analyses



Innovation: 1290 Infinity Quaternary Pump

Quaternary Pump with Binary Pump-like Performance

1200 Infinity Series



1290 Infinity Quaternary Pump

- **Boost Performance**
Highest accuracy and precision for composition and flow, with exceptionally low delay volume
- **Save Time**
Accelerates transfer of existing HPLC methods to UHPLC
- **Reduce Costs**
Outstanding UHPLC performance at HPLC-like costs of ownership



Agilent 1290 Infinity Quaternary Pump

Specifications & Benefits

Power Range

- For any kind of analysis

Composition Accuracy and Precision

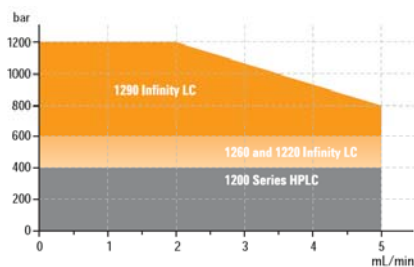
- < 0.15 % RSD or 0.02 min SD
- ± 0.4 % (1-99 % Composition B)

- High RT precision in gradient runs

Flow Accuracy and Precision

- < 0.07 % RSD or 0.01 min SD
- ± 1.0 % or 10 μ L

- High RT precision in isocratic runs



Composition Range

1-99 %

- Wide analytical range

Delay Volume

< 350 μ L

- For fast quaternary gradients

The Measure of Confidence

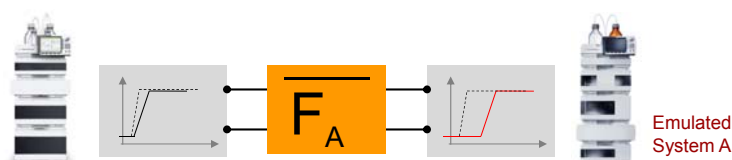
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Method Transferability: 1290 Infinity LC

- System Emulation Technology

Concept



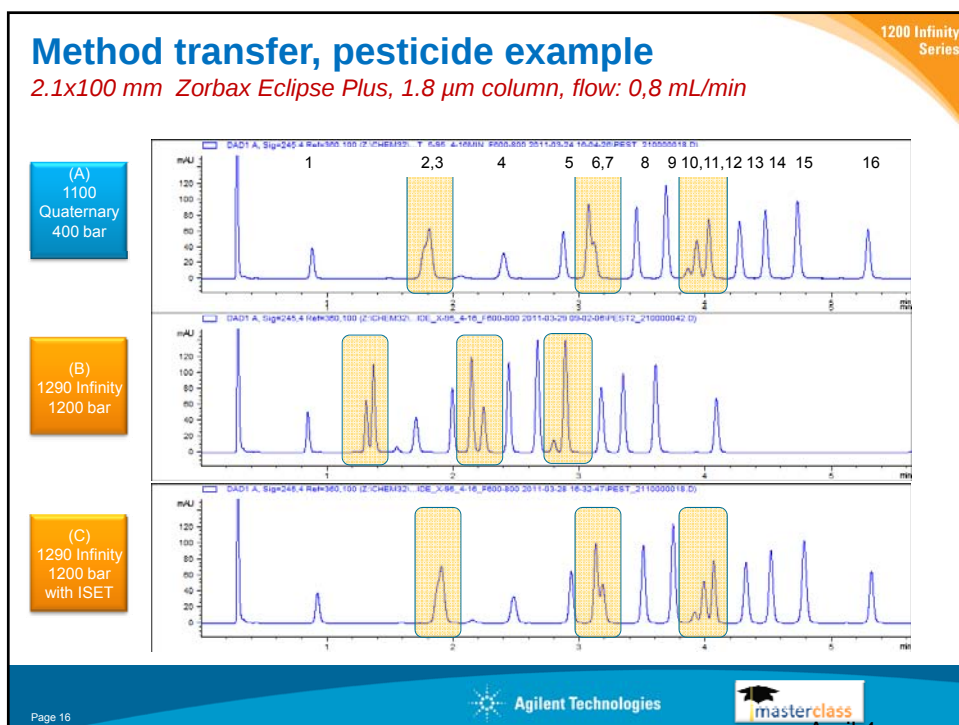
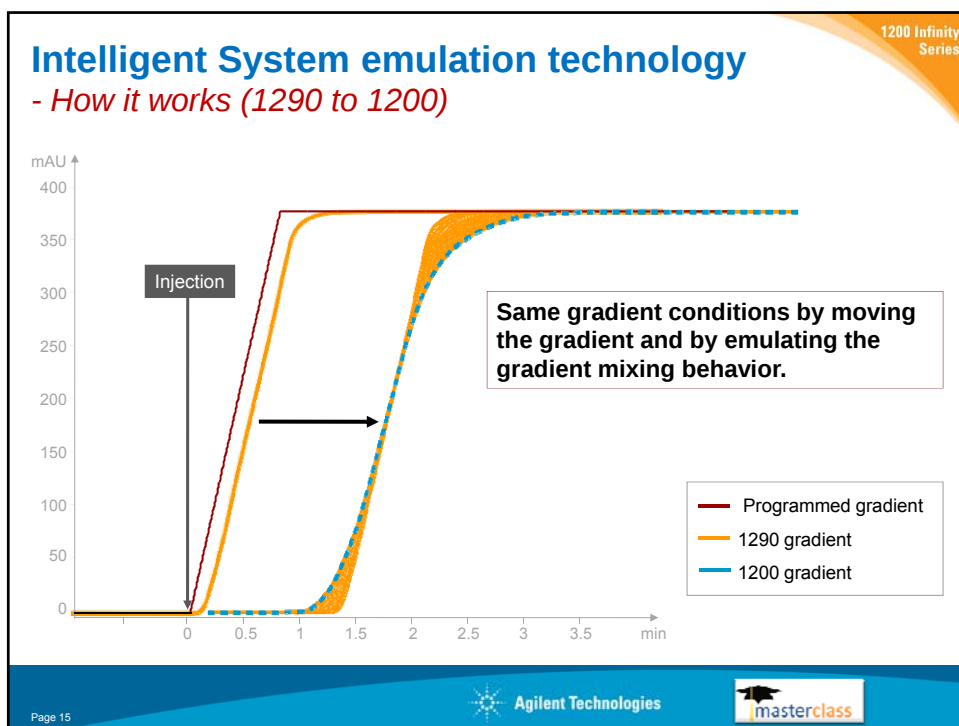
Select System to be emulated by a simple mouse click:



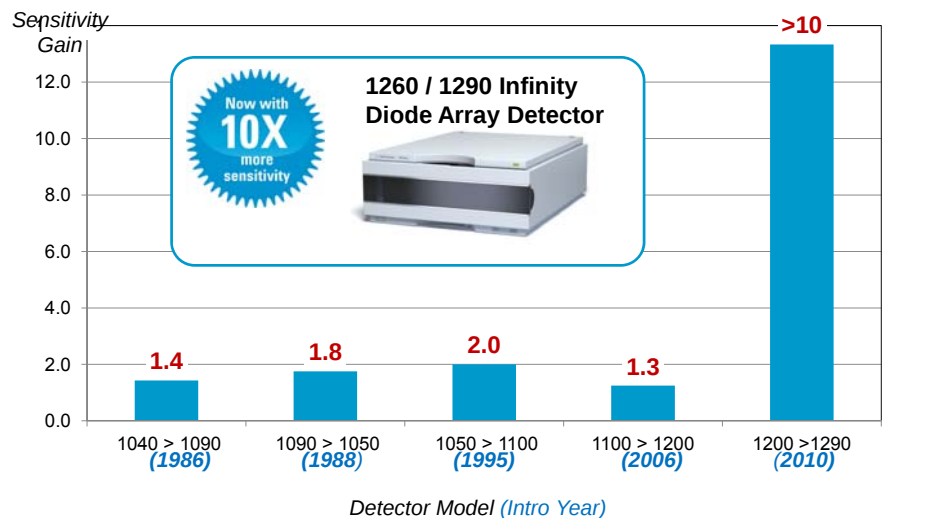
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The world's most sensitive UV detector!



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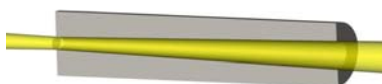
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Effects of path length increase

Conventional flow cells:



10 mm pathlength
small geom. cell volume (13 μ L)
high light transmission



60 mm pathlength
large geom. cell volume (78 μ L)
lower light transmission

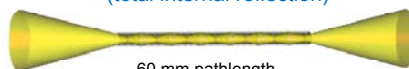
Peak Dispersion

- Loss of resolution
- Loss of signal height

Max-Light High Sensitivity cell:



Optofluidic waveguides
(total internal reflection)



60 mm pathlength
4 μ L σ_v dispersion volume

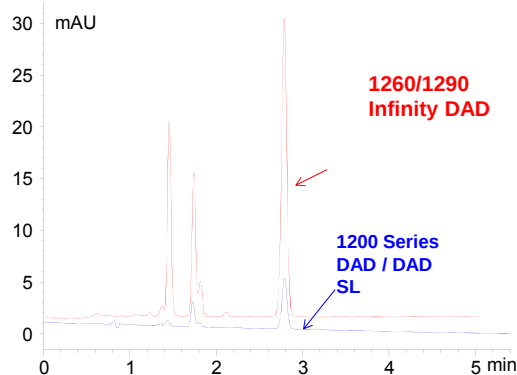
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> 10-X Higher Sensitivity

1290 Infinity DAD compare to 1200 Series DAD SL

1200 Infinity Series



Columns: 150 x 4.6mm Zorbax SB C18, 5µm
 Sample: Anthracene: 835 pg/µL
 Mobile phase: A: Water, B: Acetonitrile
 Elution: isocratic 80 % B
 Injection volume: 5 µL
 Flow: 1.5 mL/min
 DAD: 251/4nm, Ref= 450/80nm, 2.5Hz, slit width 4nm

	1260/1290 DAD 60 mm	1200 DAD SL 10mm
Height [mAU]	28.876	4.938
Noise [mAU]	0.0098	0.0190
Signal/ noise	2944	259
Increase	11.4 x	

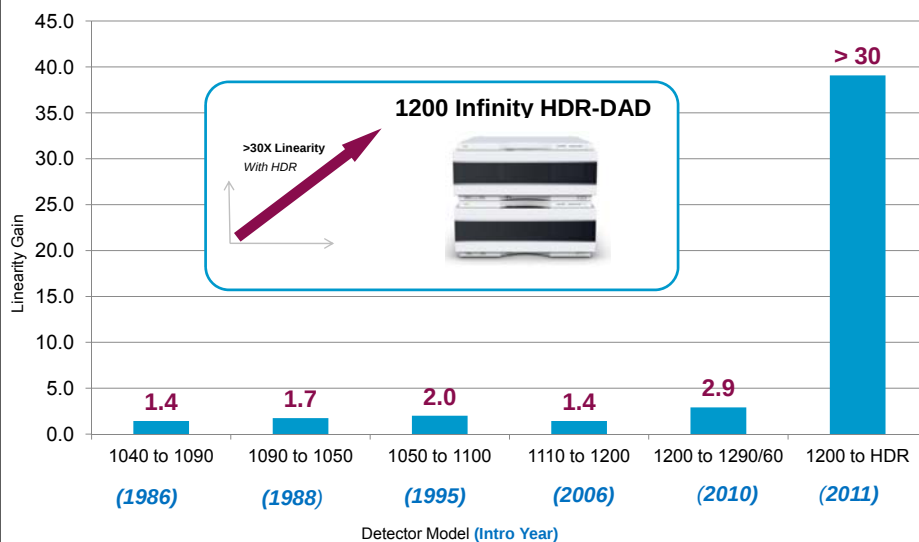
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History of DAD Linearity Gain

The last 30 years

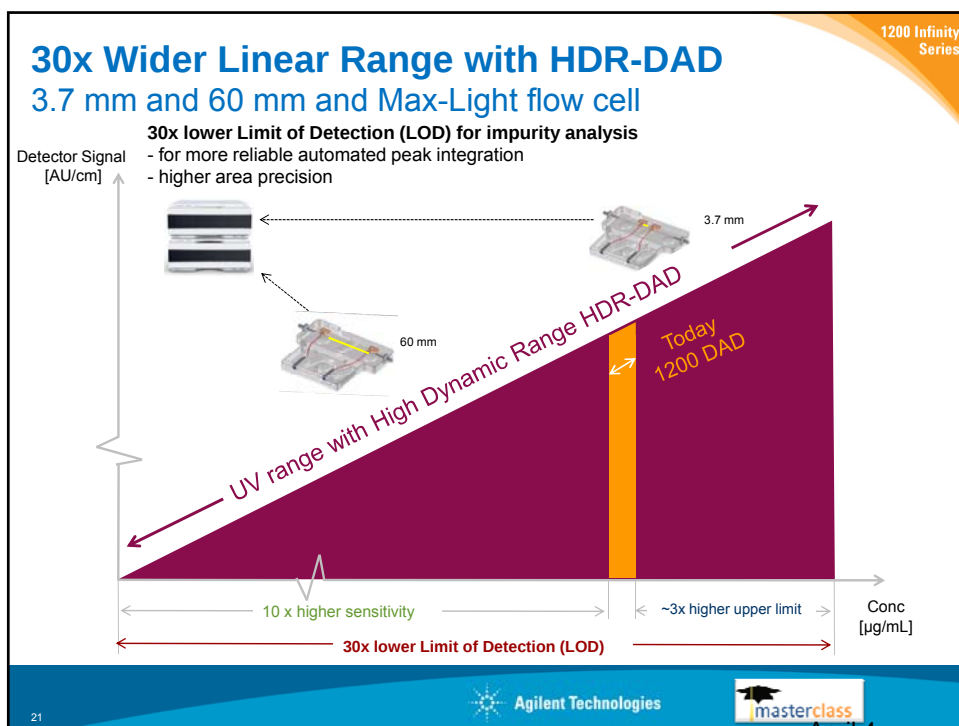
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Detector Model (Intro Year)

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Agilent 1290 Infinity 2D-LC Solution

1200 Infinity Series

- A new flexible and user-friendly 2D-LC solution for the most complex samples

2D-LC: Injecting the effluent or a part of the effluent of one column to a second column, ideally with orthogonal separation behavior.

Purpose: increase total separation power.

Peak capacities **multiply** for orthogonal separation mechanisms!

Two different modes:

- Comprehensive 2D-LC ("LCxLC")
- Heart-cutting 2D-LC ("LC-LC")

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Hardware – Module-flexibility

1200 Infinity Series

1. Dimension

2. Dimension

One or two 1290 Infinity TCC

1290 Infinity Binary Pump

1290 Infinity Autosampler or 1260 HIP Autosampler

Optional 1260/1290 Infinity Detector

Optional 1260/1290 Infinity Detector

To monitor waste-line

1260/1290 Infinity detector

1260 Infinity Capillary Pump

1260 Infinity Autosampler

1260 Infinity Binary or Quaternary Pump

For 1st dimension chromatogram and peak-triggering

Almost any Agilent pump or autosampler in the 1st dimension!
Almost any detectors are supported!
A 1290 Infinity Binary Pump for the 2nd dimension is required.

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Supported 2D-LC operation modes

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comprehensive LCxLC

complex/unknown samples: bio-pharma, food, polymers....

1D chromatogram

2D sampling

2D gradient

Heart-cutting LC-LC

Time-triggered
or
Peak-triggered

Known samples/improving confidence: pharma, meth.-dev..

level

level

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Comprehensive 2D-LC – gradient modes

- special ²D-gradient modes to improve resolution

- standard repeating with start- and end-time
- constantly shifted %B_{2D}
- constantly shifted %B_{2D} and shifted Δ %B_{2D}
- Any combination

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OpenLAB CDS: Intelligent Reporting

New custom reporting application –embedded into OpenLAB CDS

Intuitive report template generation with drag & drop and interactive report preview functionality

Pre-configured report items (tables, graphics, matrices) make it easy to generate custom reports

Easily include graphics such as your company logo

Embedded custom calculation functionality to calculate final results – here %label claim

Intelligent Reporting: Including limit checks into report
Decision-based result representation (pass/fail)

Sample Name	Tested (µg)	Target (µg)	% Target	Pass/Fail
Sample 1	8037.888	1113	128.7	Pass
Sample 2	8038.274	1113	128.8	Pass
Sample 3	8038.424	1113	128.9	Pass
Sample 4	8038.512	1113	128.9	Pass
Sample 5	8038.512	1113	128.9	Pass
Sample 6	8038.512	1113	128.9	Pass
Sample 7	8038.512	1113	128.9	Pass
Sample 8	8038.512	1113	128.9	Pass
Sample 9	8038.512	1113	128.9	Pass
Sample 10	8038.512	1113	128.9	Pass

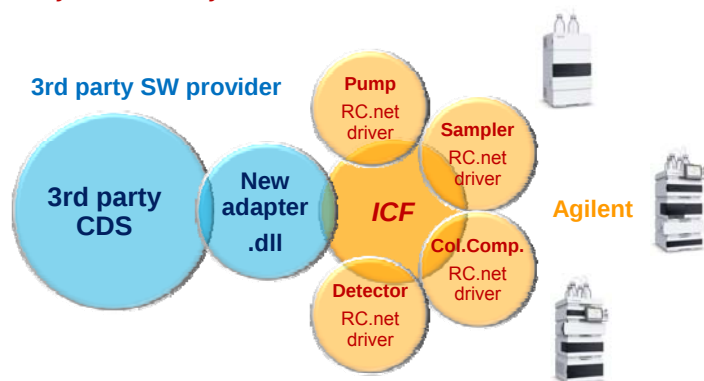
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Group/Presentation
Title Month ##

NEW: Instrument Control Framework (ICF)

The 3rd Party Connectivity Solution



- Agilent **developed** and specified the ICF
- Agilent **provides** RC.net drivers for its LC-modules
- Agilent **provided** ICF **for free** to 3rd party CDS provider
- 3rd party CDS provider **only** needs to implement the ICF into their software



NEW: Instrument Control Framework

The 3rd Party Connectivity Solution

Improved
Communication for
Regulated Labs!!!

Advantages for Customers

- **Full and Robust Control** – all features supported by Agilent drivers
- **Immediate Control** – Plug and Play (like a printer driver)
- **Future Proof Control** – Backwards compatibility of functional extension

Advantages for Application Software Suppliers

- **Cost Savings** – Develop one Adapter instead of 50 Drivers, no more instrument purchase required
- **Customer Satisfaction** – Immediate control, no HW-features missing anymore
- **Risk Reduction** – Use drivers tested by Agilent to perfectly match the HW



NEW: 1200 Infinity Series
More workflow-automation and application-based solutions

1200 Infinity Series



Analytical SFC Bio-inert HPLC Nano LC & Cap LC Preparative LC & LC/MS GPC SEC Isocratic LC



Multi-method and Method Development High-throughput LC & LC/MS Nanoflow HPLC-Chip MS

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NEW: 1200 Infinity Series – Agilent Value Promise
Infinitely Higher Investment Protection

1200 Infinity Series



Full module compatibility

- Mix 1220, 1260, 1290 Infinity LC with 1100 and 1200 Series – and future systems !

Stepwise upgrade – now and in future:

- Exchange Detector only – for higher sensitivity and detection speed.
- Exchange Pump and Autosampler only – for ultra-high resolution LC on latest 1.8 μm rapid resolution column technology
- Exchange Column Compartment only – to upgrade to a fully automated multi-method or method development solution supporting up to 8 columns and 24 solvents.

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