1290 Infinity Quaternary Pump – how binary pump-like performance can enhance and widen your lab efficiency

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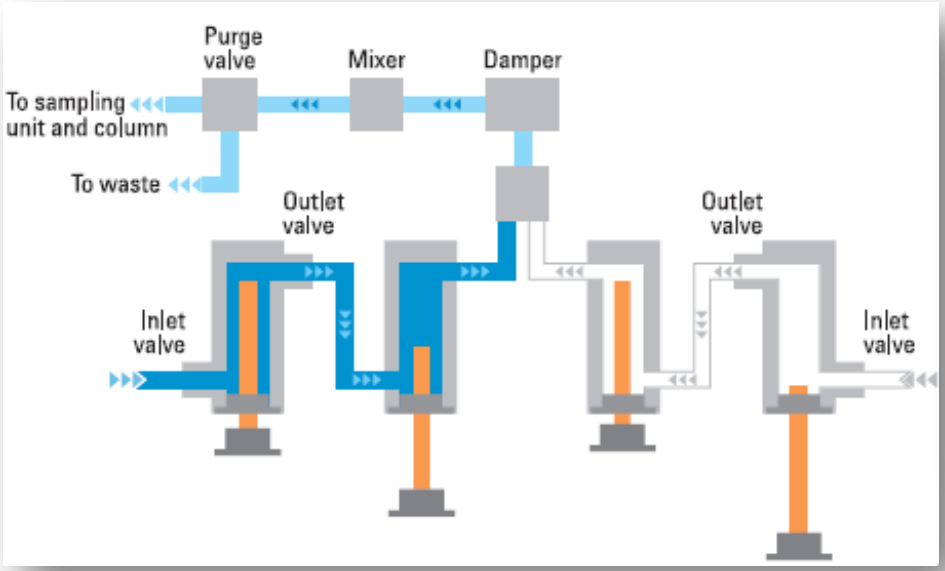
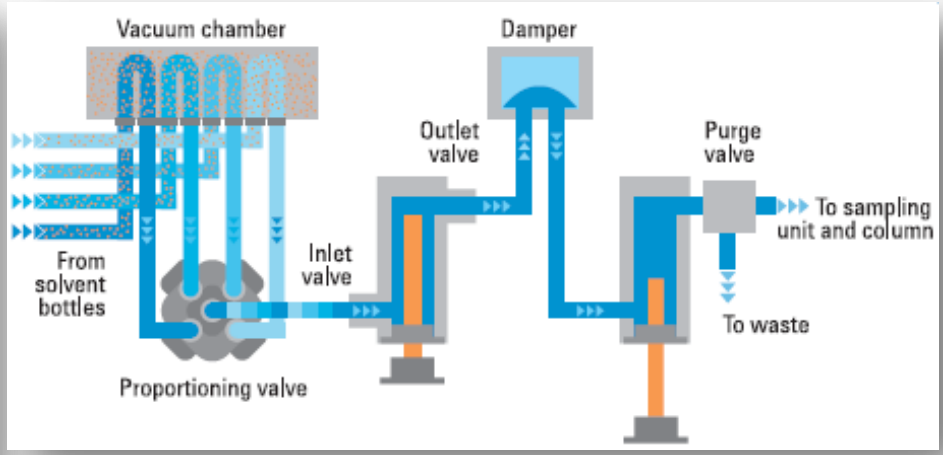
Agilent Technologies

High Pressure vs. Low Pressure Mixing Principle

Binary pump → High Pressure Mixing



Quaternary pump → Low Pressure Mixing



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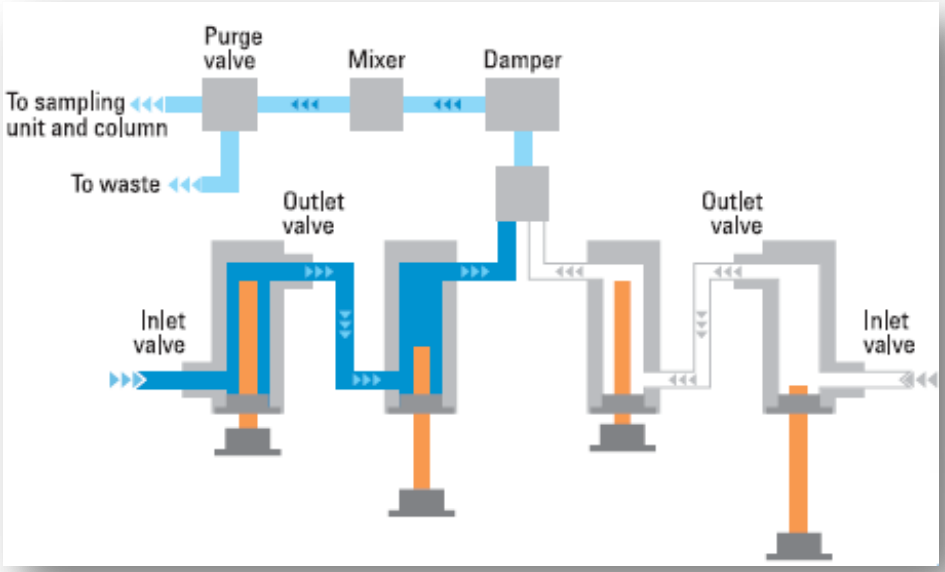

- Combination and mixing of mobile phases <u>after</u> the pump head
- <u>Possible influence</u> of excess volume on gradient (→ flow accuracy!)

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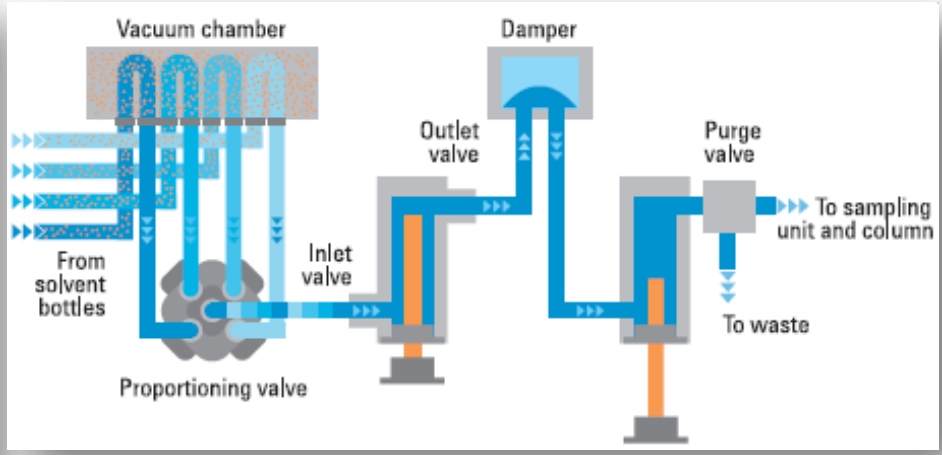


- Combination and mixing by low-pressure proportioning valve <u>before</u> the pump head
- <u>No influence</u> of excess volume on gradient, but on composition accuracy!

Preliminary Pump Specifications

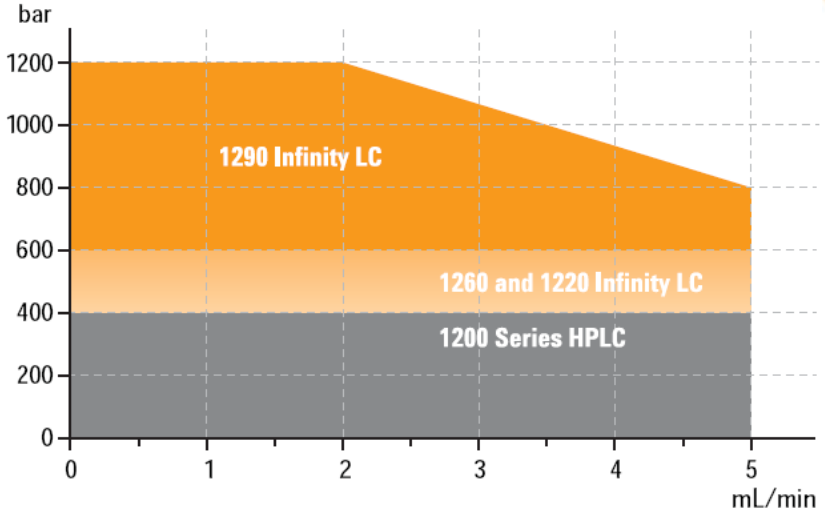
- **Power Range**
  For any kind of analysis

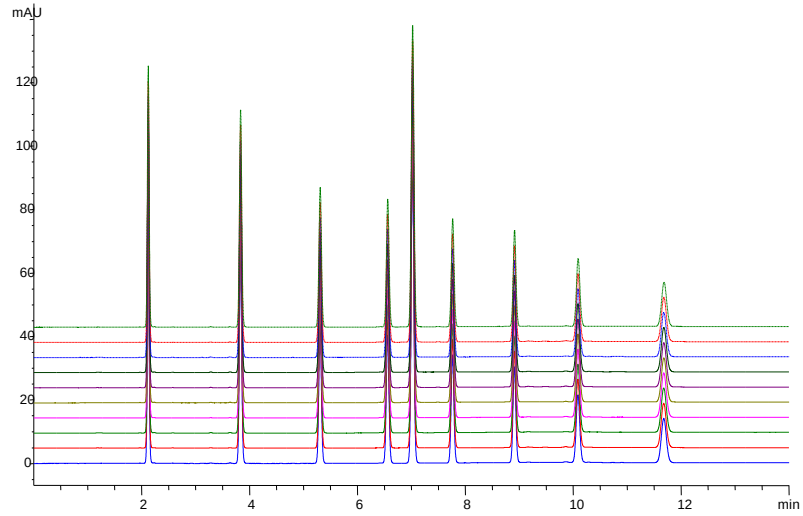
- **Flow Accuracy and Precision**
  Flow Accuracy <0.07% RSD or 0.01min SD
  Flow Precision ± 1.0% or 10µl
  Highest RT precision in isocratic runs

- **Composition Accuracy and Precision**
  < 0.15 % RSD or 0.02min SD
  ± 0.4 % (1-99% Composition B)
  Highest RT precision in gradient runs

- **Composition Range**
  1-99%
  Widest analytical range

- **Delay Volume**
  < 350µl
  For fastest quaternary gradients

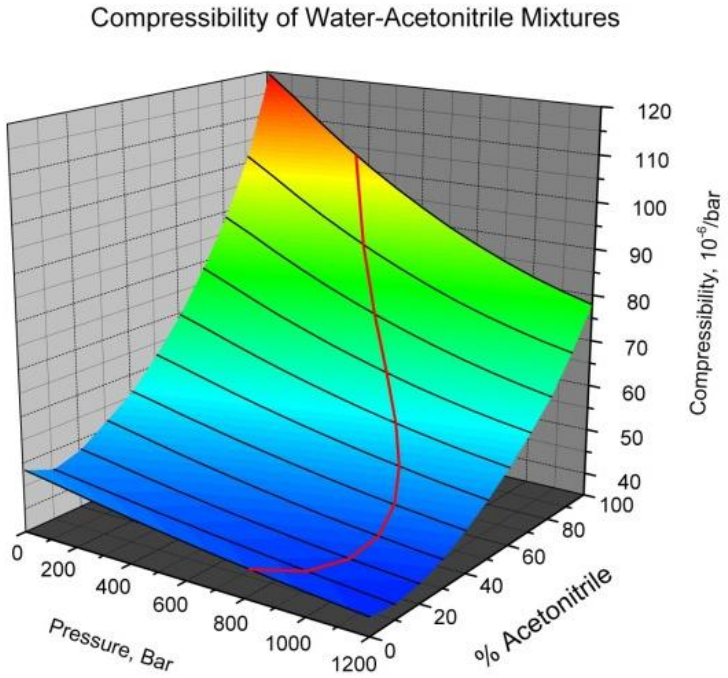




The Story of the 1290 Infinity Quaternary Pump is a Story about **Accuracy**!!

3 Crucial Points to achieve ultimate quaternary pump performance (low pressure mixing!):

1. For best performance you must know your eluents



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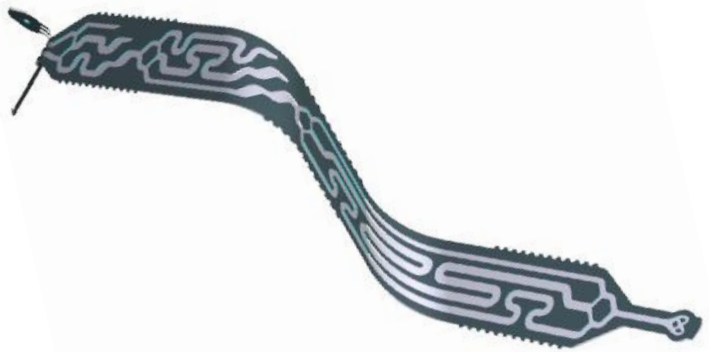
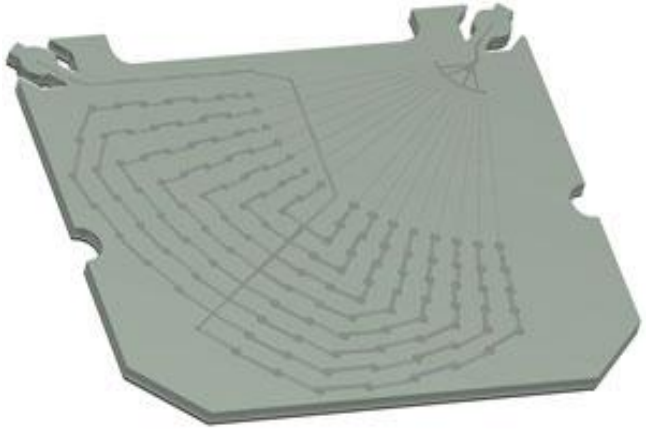
3. New InletWeaver using proven Jet Weaver technology





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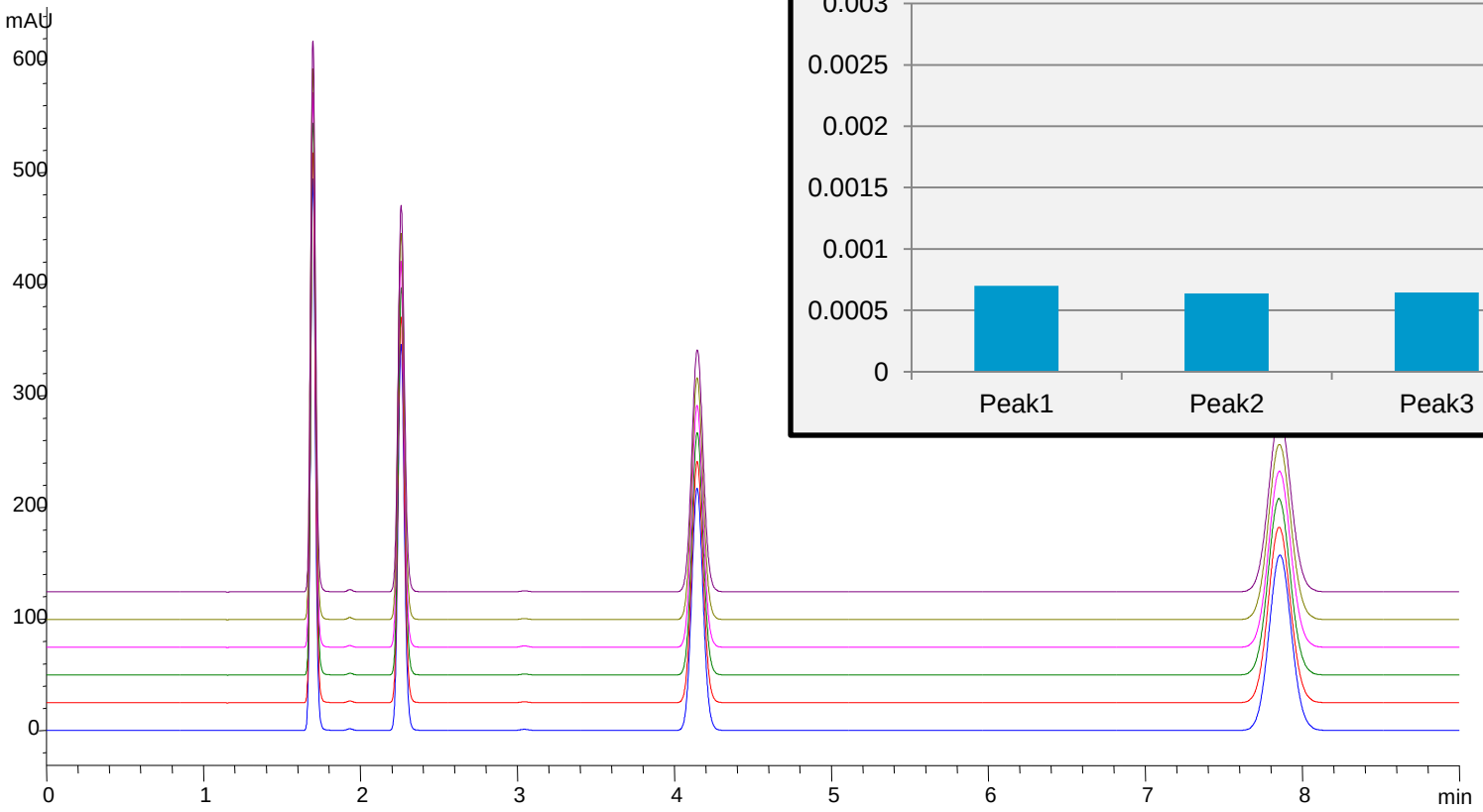
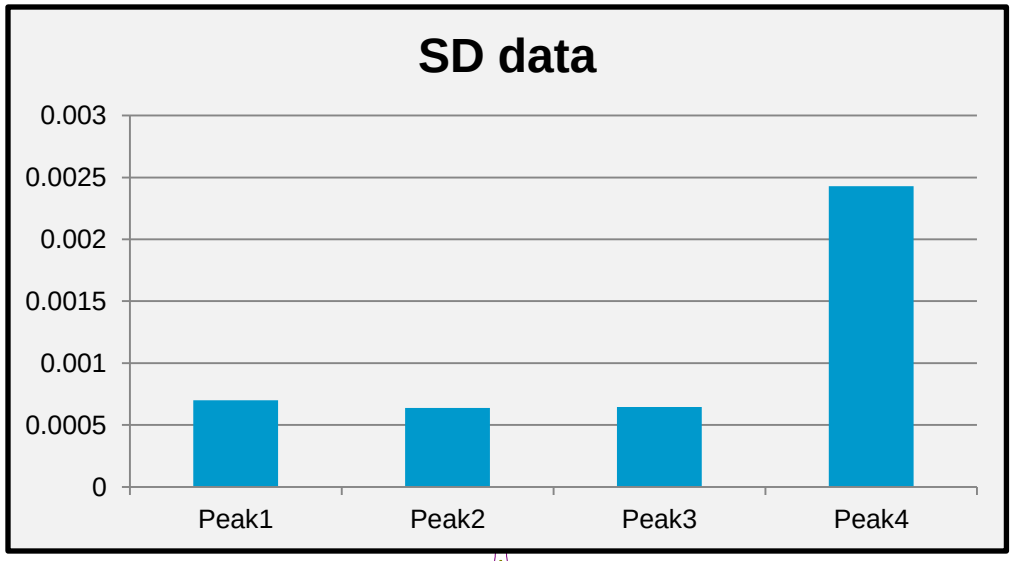
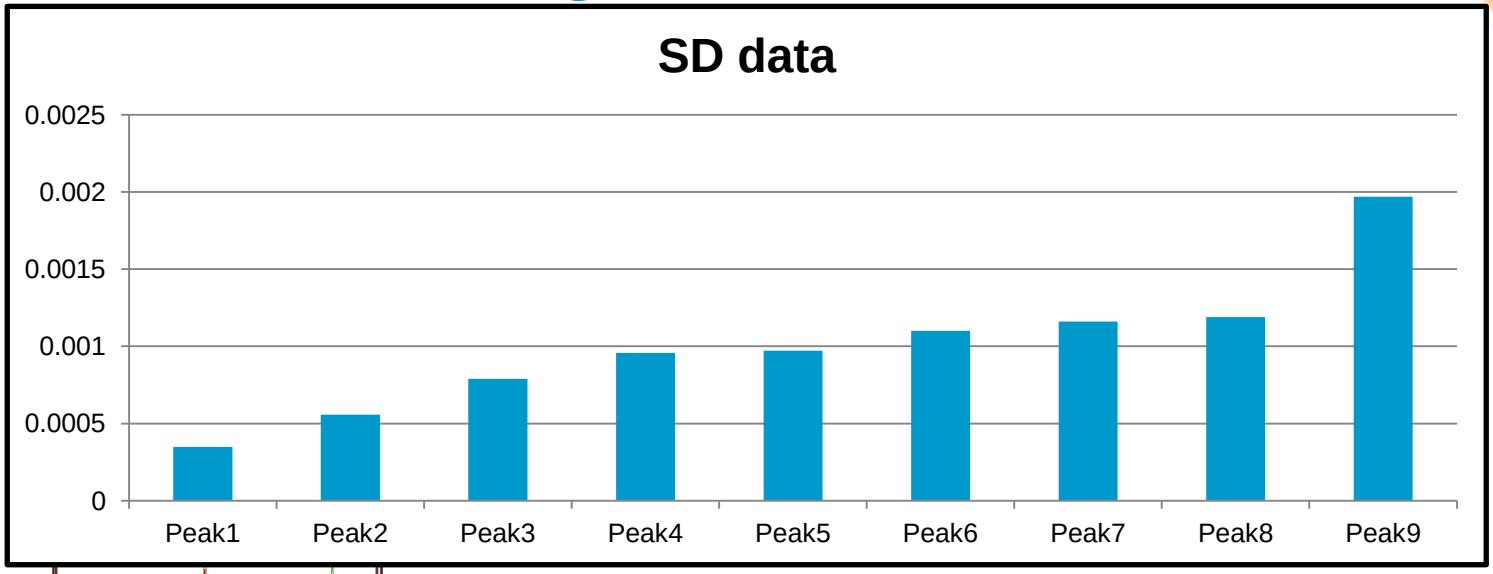
The 1290 Infinity Quaternary Pump offers the highest accuracy and precision over the **full application range**!

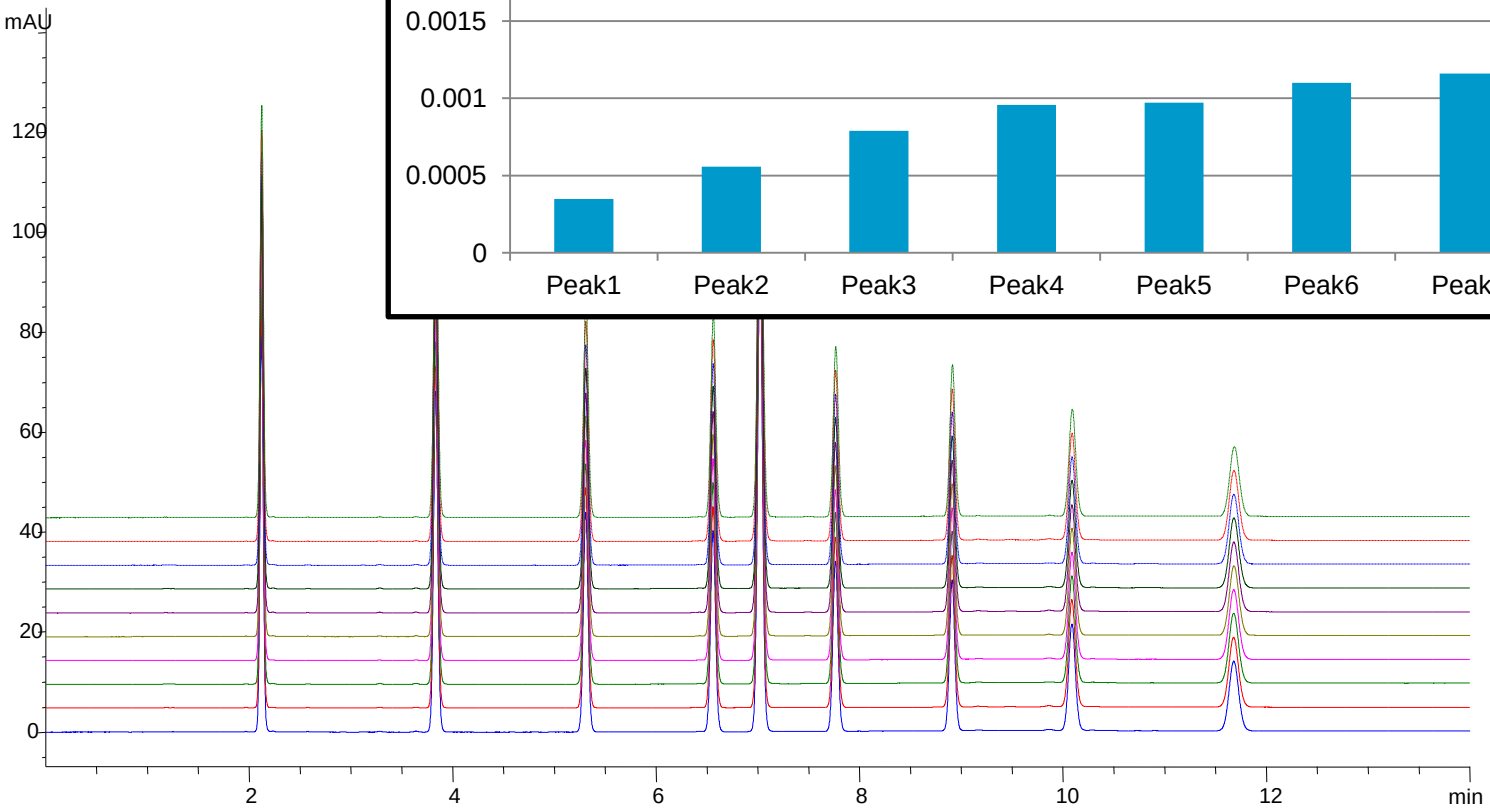
1290 Infinity Quaternary Pump - Isocratic Analysis





1290 Infinity Quaternary Pump - Analysis of RR sample with conventional gradient method





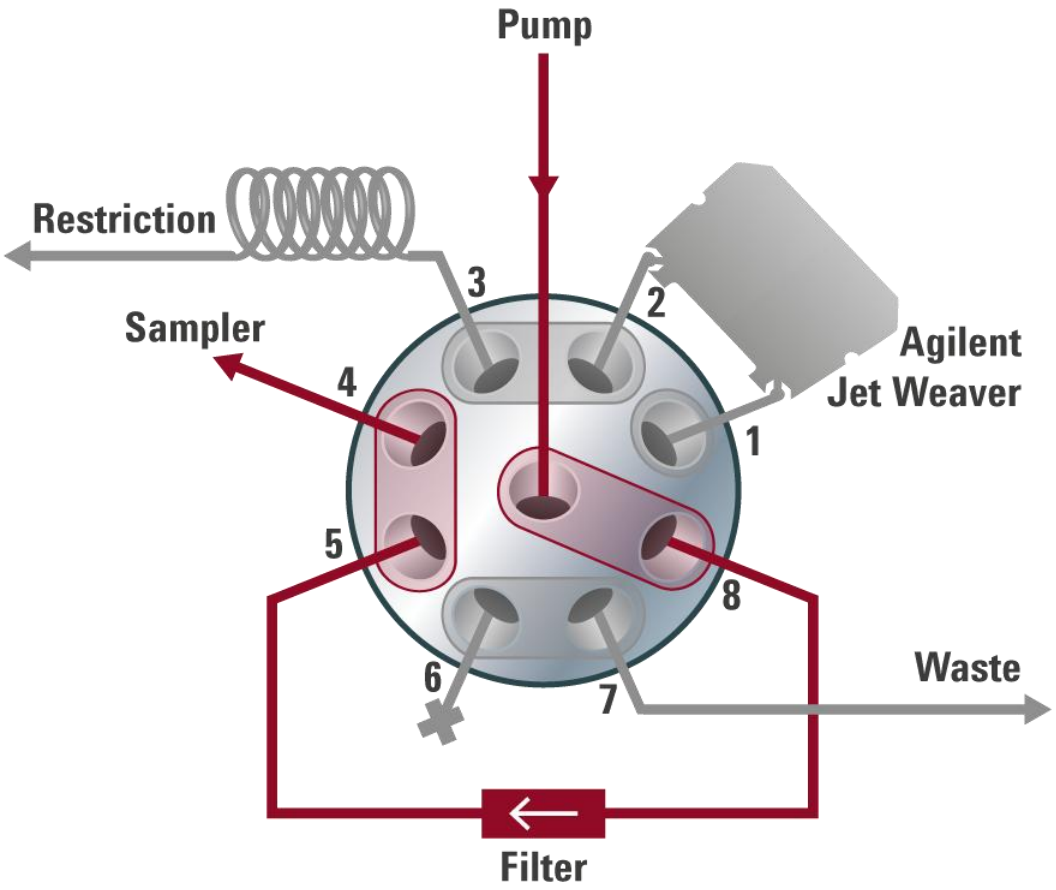
1290 Infinity Quaternary Pump

Various tools enabling the high performance

- **4-channel Degasser**
- **MCGV (Multi-Channel-Gradient-Valve)**
- **Inlet-Weaver**
- **Pump Head**
- **Multi-Purpose-Valve**
- **In-line Filter**
- **Switchable Jet Weaver Mixer**

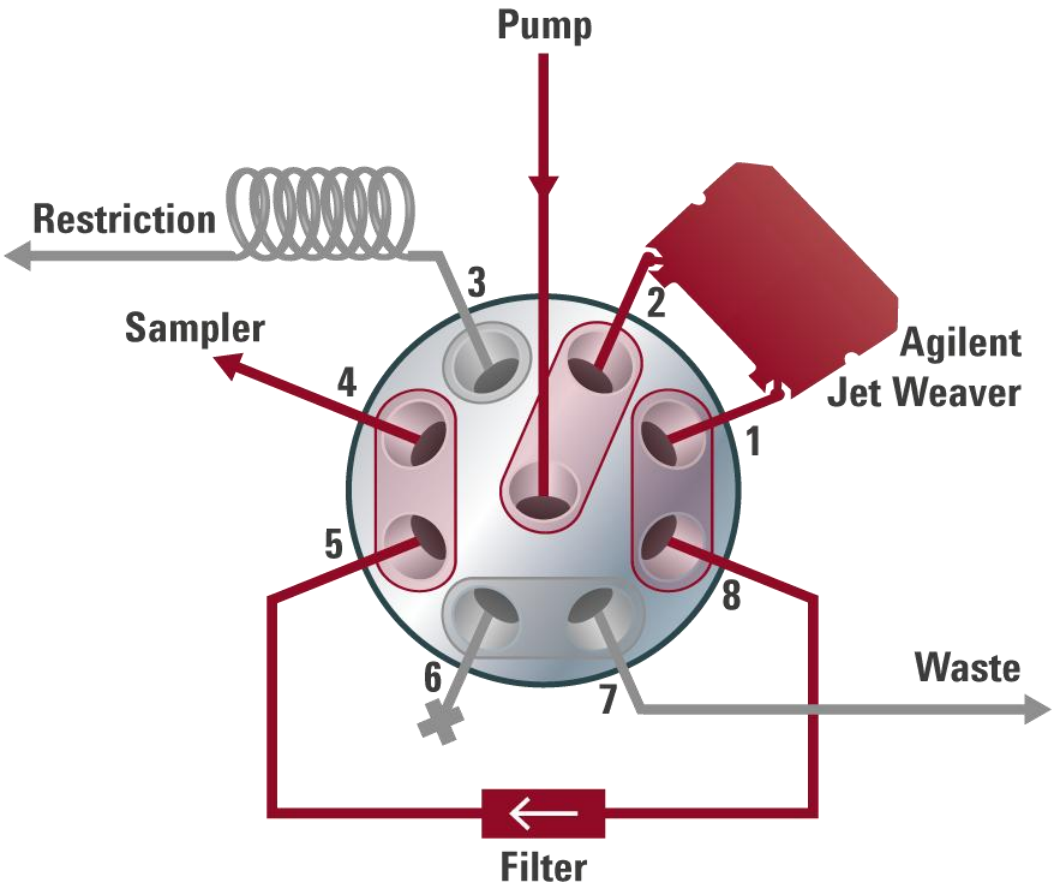
Multipurpose valve functions for highest comfort

Standard Application for standard Delay Volume



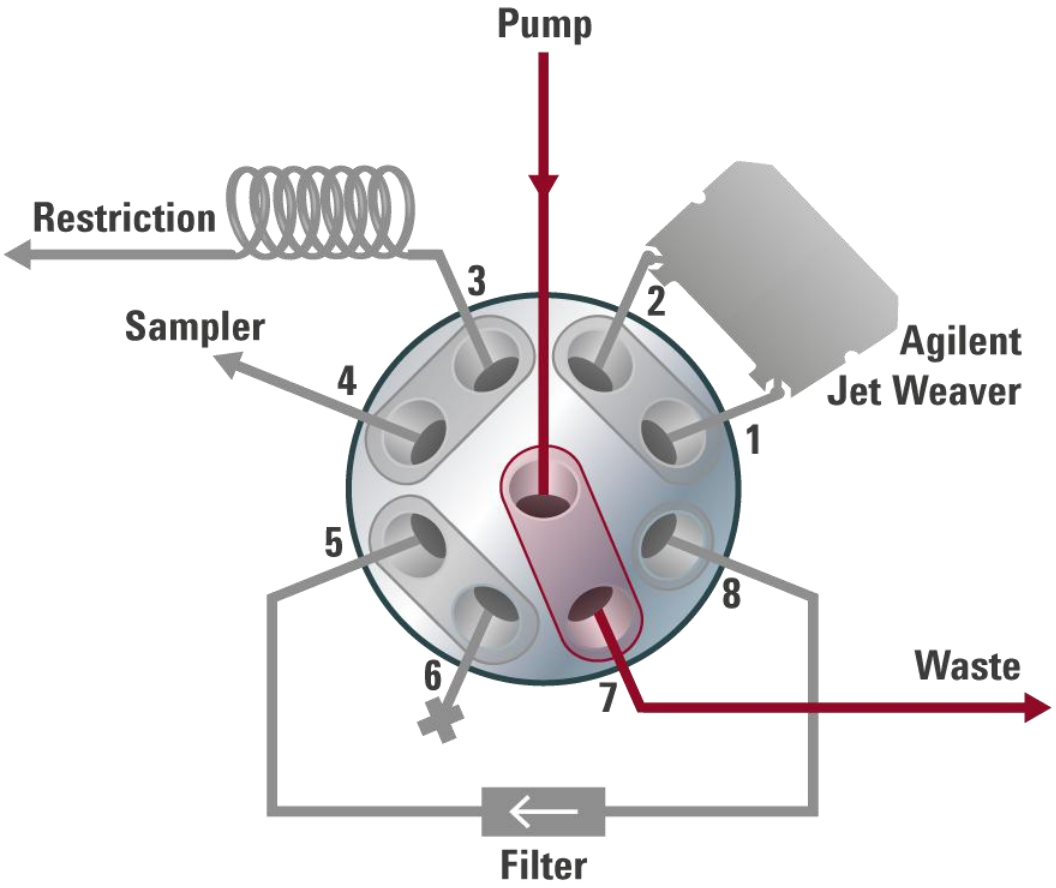
Multipurpose valve functions for highest comfort

Extra Mixing Volume for lowest baseline ripple (TFA applications)



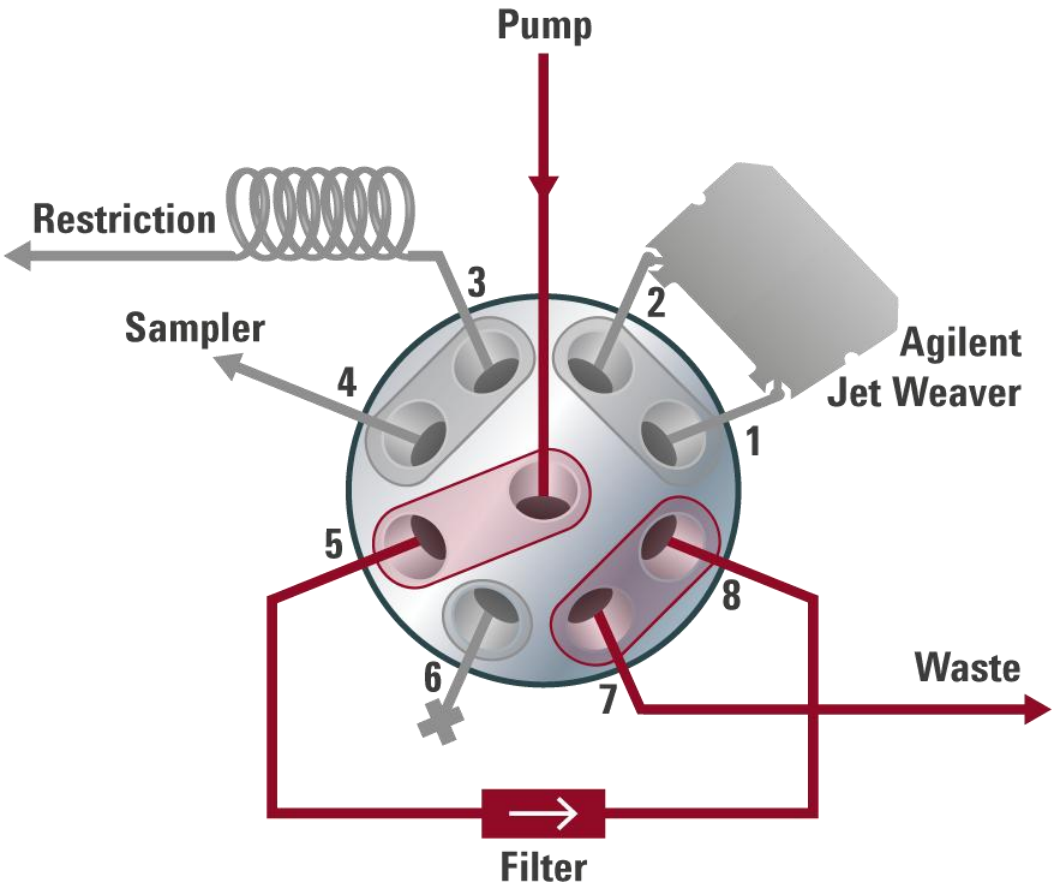
Multipurpose valve functions for highest comfort

Automatic Purging



Multipurpose valve functions for highest comfort

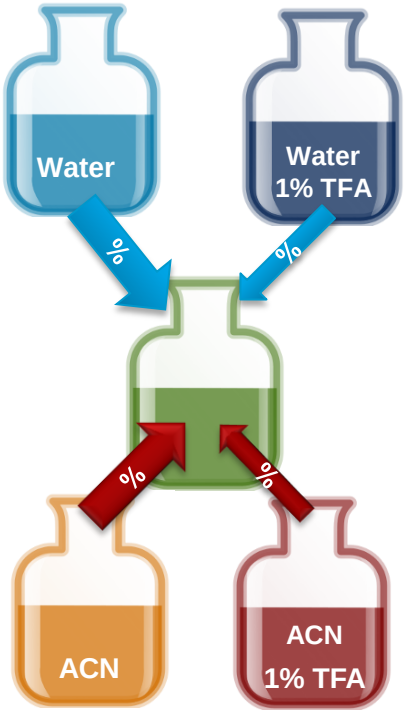
Automatic filter backflush



1290 Infinity Quaternary Pump - BlendAssist

Simple tool for online-dilution of modifiers and gradient set-up

You need different concentrations of modifiers in your analysis, would like to have just one stock-solution and do online dilution to profite from the quaternary mixing capability of your pump? Here is a simple tool – ***BlendAssist***!



Desired method conditions - example:

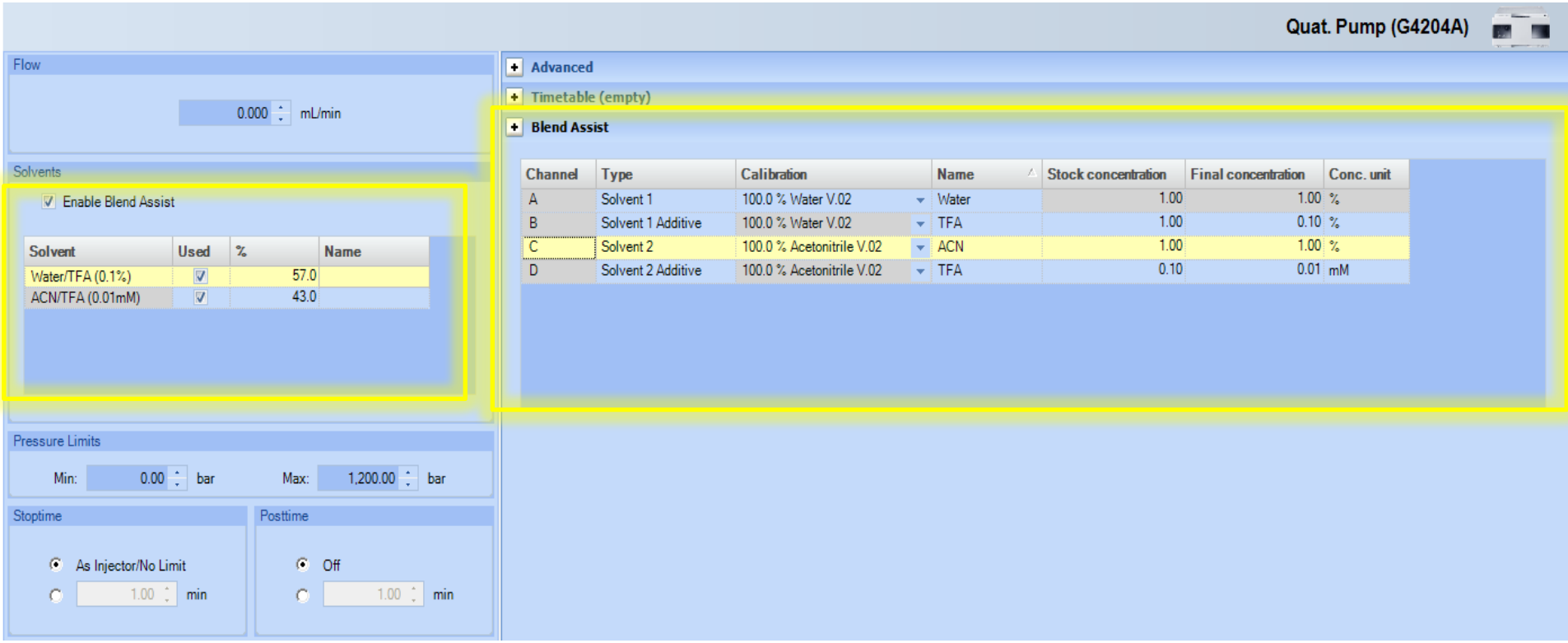
1. 5 to 95% gradient of ACN with 0.1% TFA in Water and 0.08% TFA in ACN
2. 20 – 80% gradient of ACN with 0.5% TFA in Water and 0.4% TFA in ACN

Without BlendAssist you need to either pre-mix the required solvents or by using stock-solutions of TFA in Water and ACN to program complex gradients (%A, B, C, D).

With BlendAssist: just program your binary organic/aqueous gradient and define the dilution factor!

1290 Infinity Quaternary Pump - BlendAssist

Simple tool for online-dilution of modifiers and gradient set-up

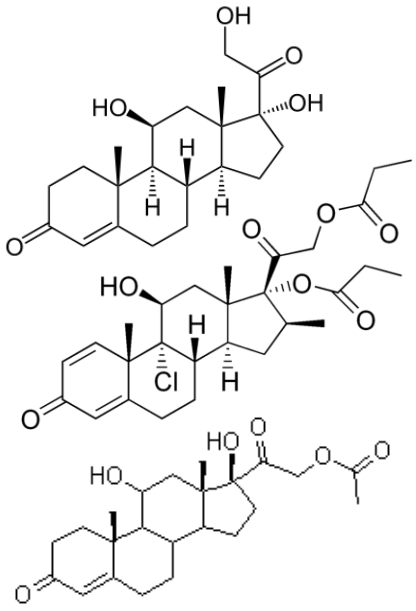


A Real Life Example: Isocratic analysis of Glucocorticoids

Hydrocortisone

Beclomethasone-di-proprionate

Hydrocortisone acetate

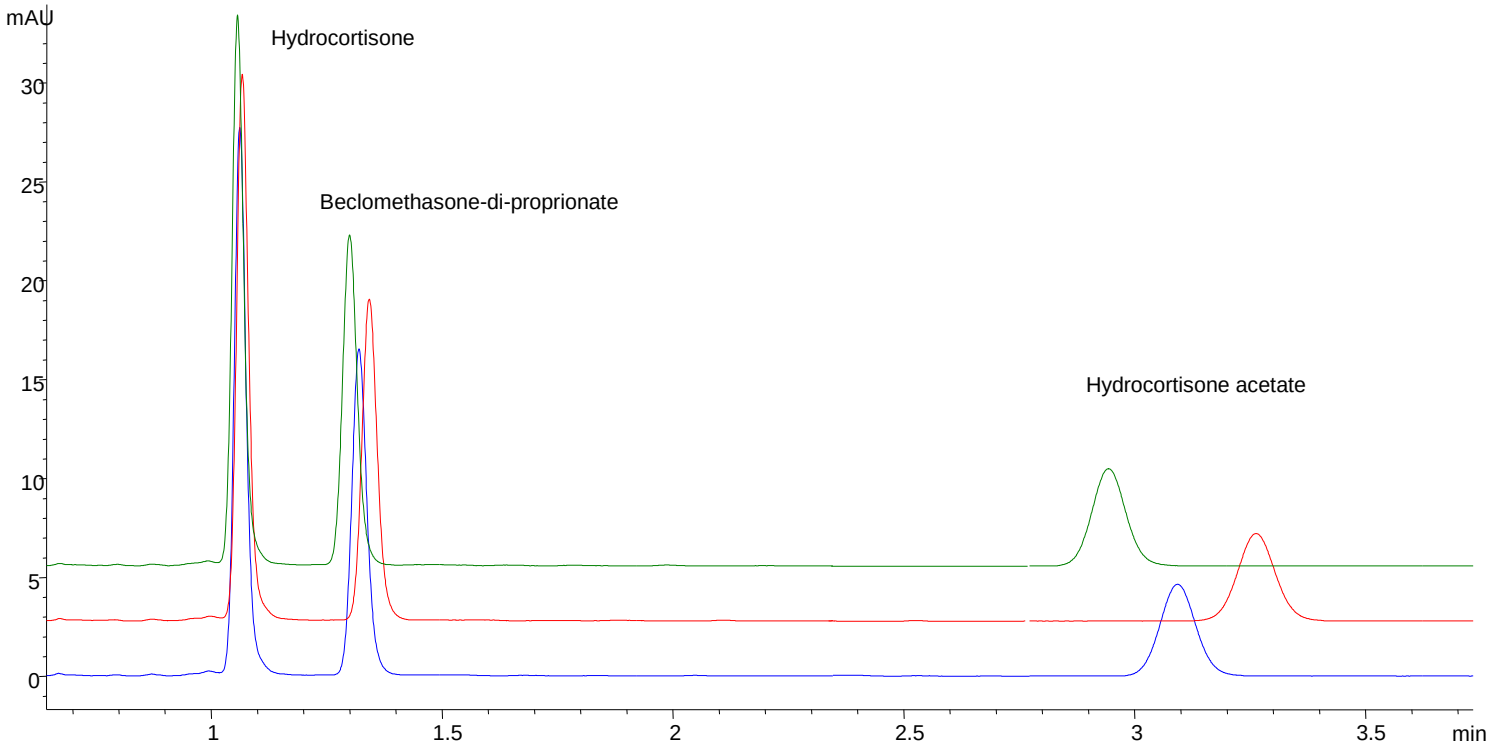


Comparing RT precision:

- with dynamically mixed solvent using the 1290 Infinity Quaternary pump
- using premixed solvent with the 1290 Infinity Quaternary pump
- with different batches of premixed solvent - User-influence

RT Variation based on solvent mixtures

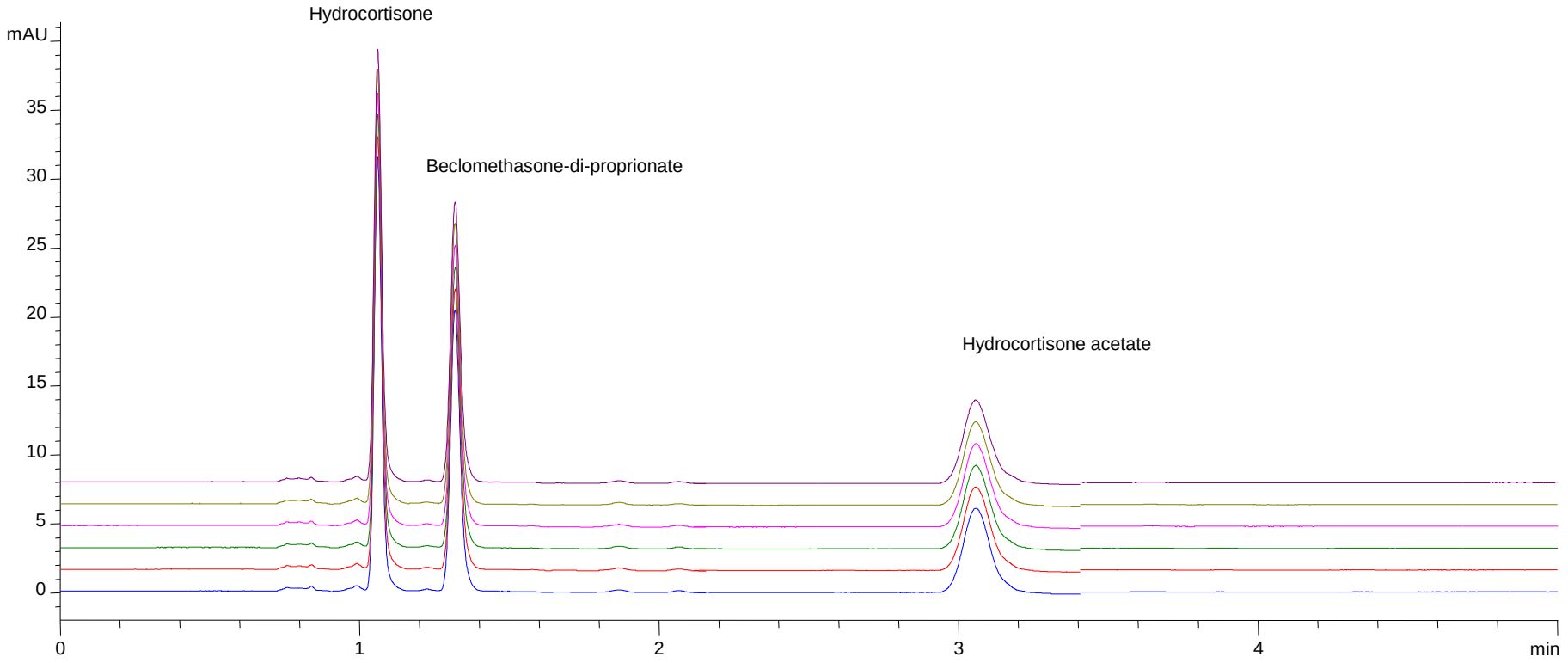
- Influence of 1% deviation of solvent composition



71% ACN
69% ACN
70% ACN

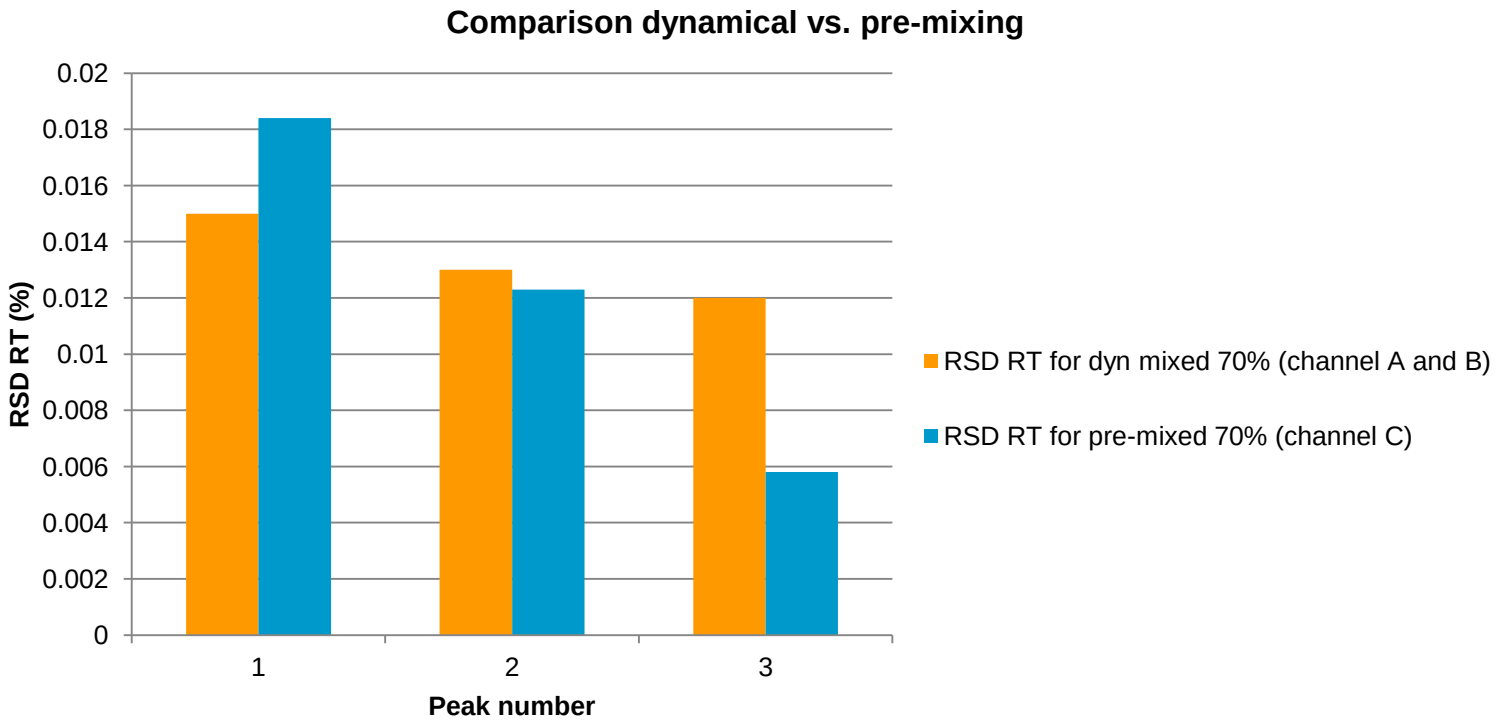
Analysis of Glucocorticoids

- Using a dynamically mixed mobile phase



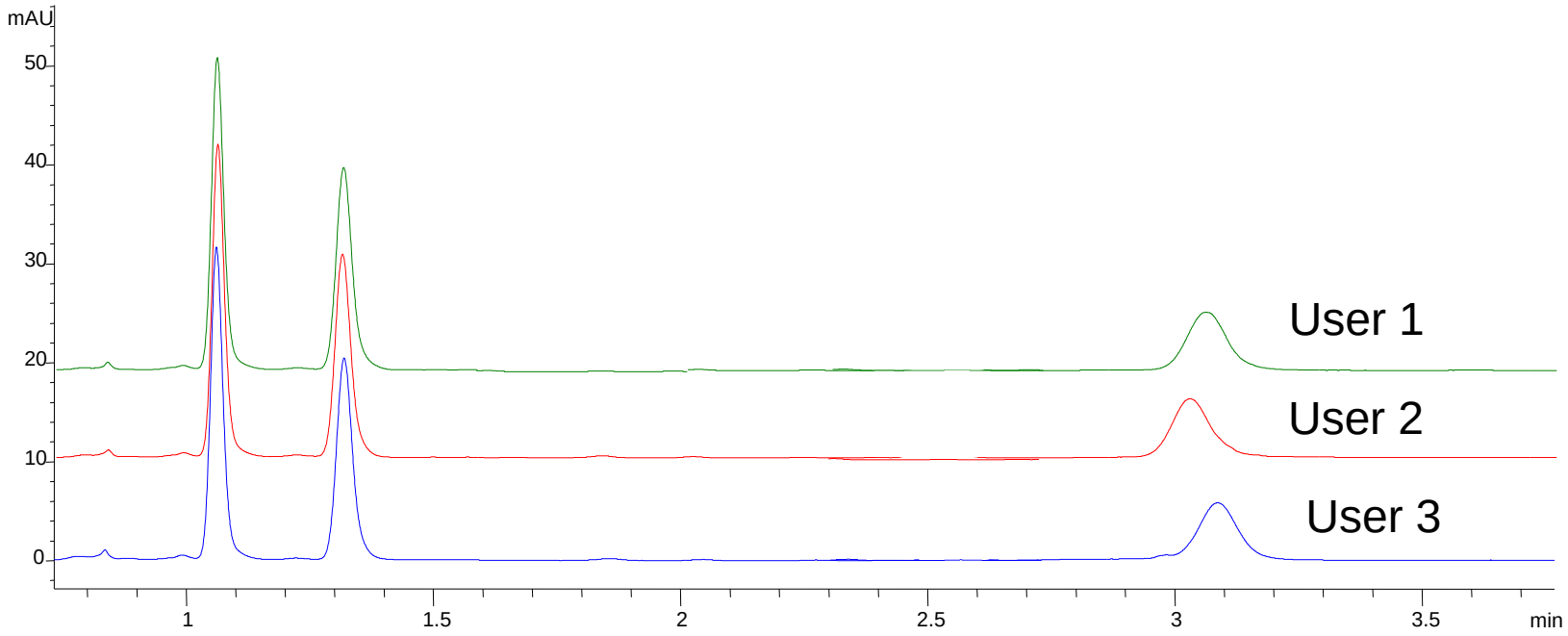
Analysis of Glucocorticoids

- Dynamically mixed vs. one premixed mobile phase



Analysis of Glucocorticoids

- Comparing dynamically mixed mobile phase vs. user influence



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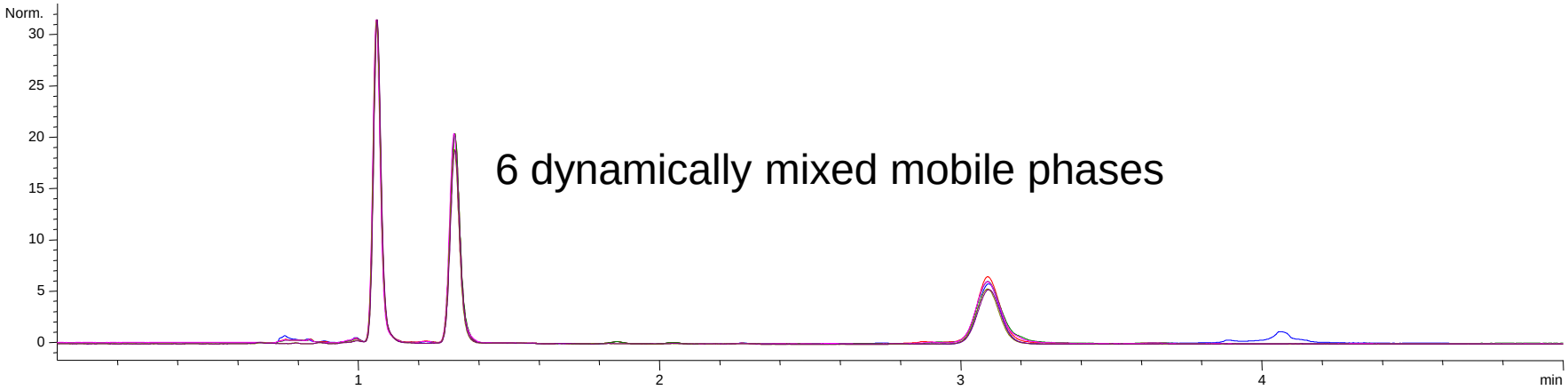

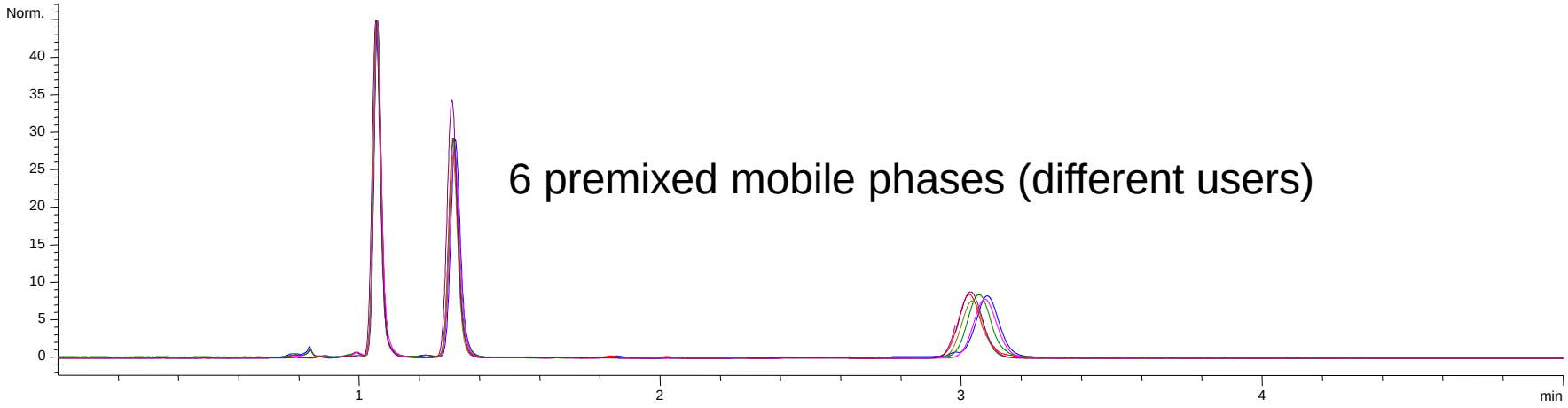

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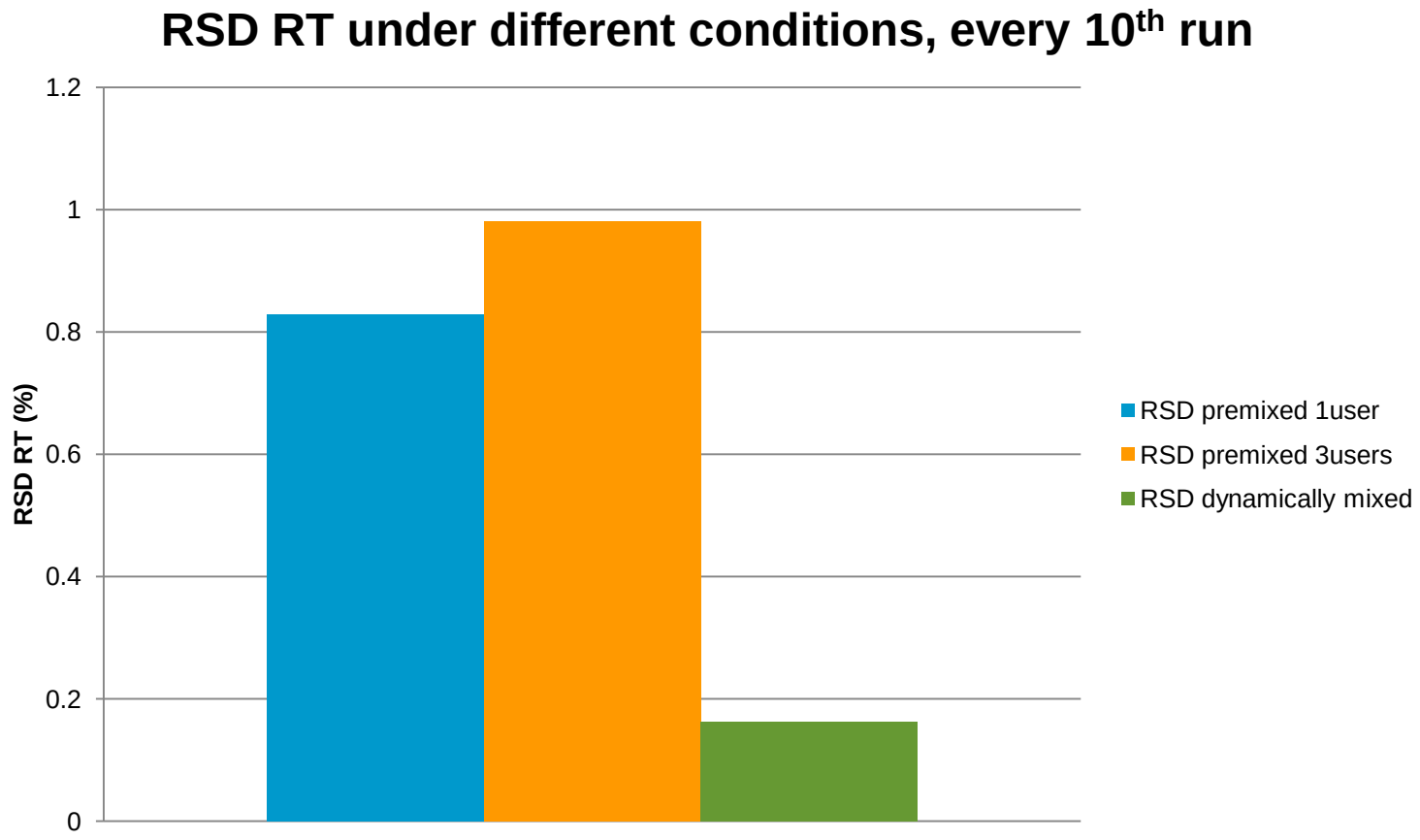

1290 Infinity Quaternary Pump

Application Areas

- Method Development
- Automated Workflows & Walkup Systems
- Quality Control & Quality Assurance (QA/QC)
- Drug Discovery
- Drug Development
- Food Safety & Enviromental Analysis
- Metabolomics
- Forensics & Doping Control
- Front-End for Mass Spectrometer

1290 Infinity Quaternary Pump

Conclusion

- Full 1290 Infinity LC Power range
- Highest composition precision and accuracy, solvent independent and across pressure and flow rate range

→ **Full application range & binary-like pump performance!**

- Blend Assist for Buffer/Additive Blending
- ISET-ready!
- Lower Price than 1290 Infinity Binary Pump!

→ **Full flexibility!**

→ **HPLC-like costs of ownership!**

More information

Learn more about how the Agilent 1290 Infinity Quaternary Pump enables the most accurate and reliable analysis, combined with the flexibility of ternary and quaternary gradients.

See the video or the free on-demand e-seminar at www.agilent.com/chem/infinity-quat