



# Thermo Scientific Vanquish System

[www.thermoscientific.com/Vanquish](http://www.thermoscientific.com/Vanquish)

Revolutionize Your UHPLC Experience

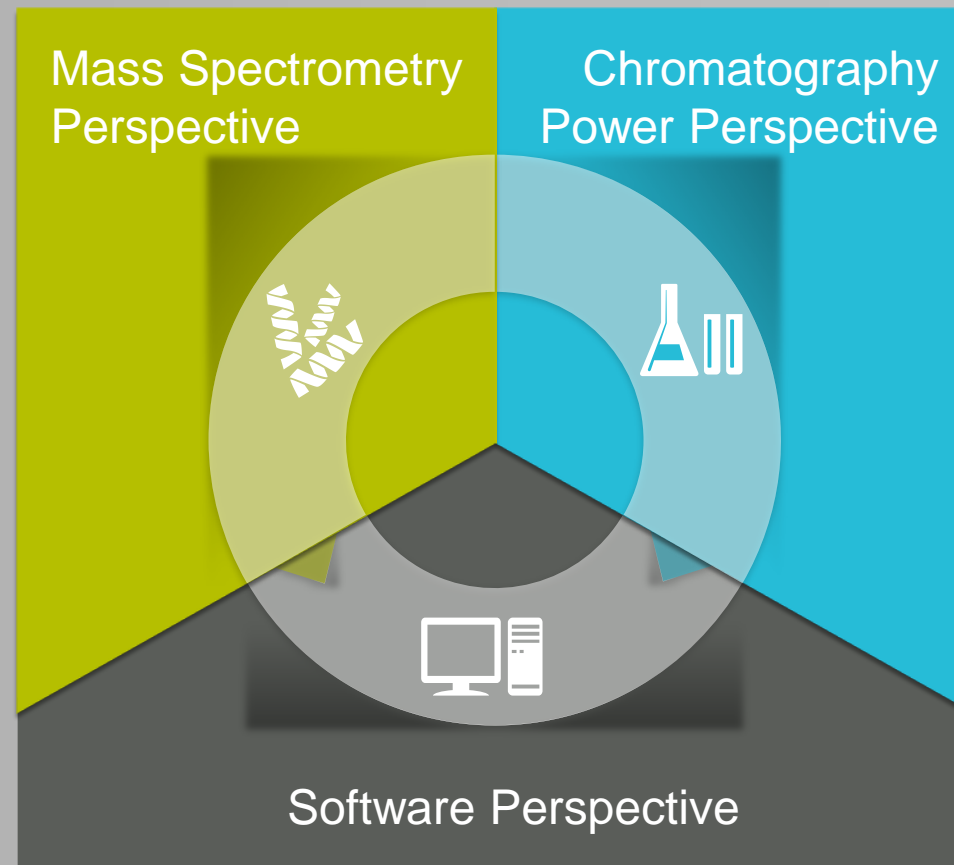


The world leader in serving science

# Why a New UHPLC?

## Customers told us they need:

- More resolution
- More sensitivity
- Easier and less method development
- More productivity
- Easier interaction and operation
- More robust and more reliable
- More sample capacity
- More access to experts
- More and fast service
- New, fresh & exciting instruments
- Better results in shorter time



# Why a New UHPLC?



## Performance

We feel that achieving better performance is not the same as spending more effort.



## Throughput

Our mission is to let you find better answers, more answers, and get them faster.

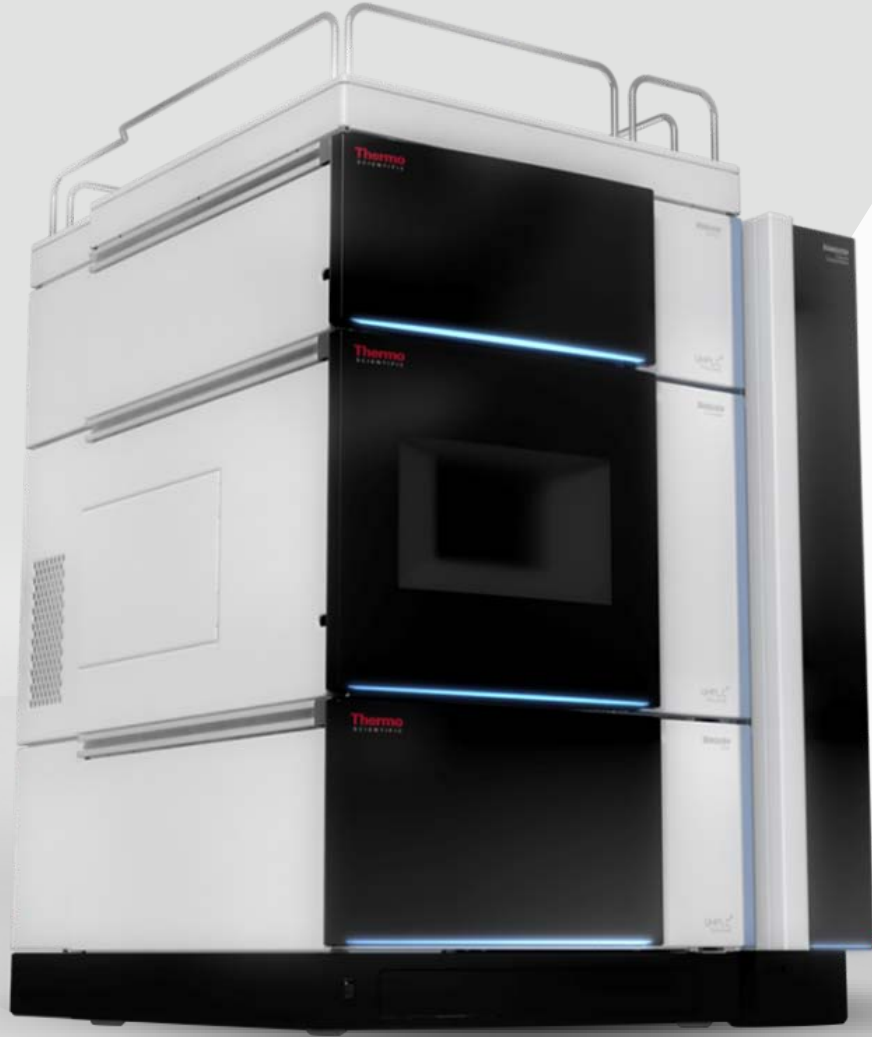


## Interaction

Make your life as a chromatographer easier by seeing what you couldn't see before and doing what you couldn't do before.

We know that every breakthrough starts with a challenge.  
**We want that challenge to be your science, not your instrument.**

# Introducing The New Thermo Scientific Vanquish UHPLC System



## We heard you! And we:

- Started with a complete new design
- Put in 30 years of experience and know-how
- Developed a new and unique technology
- Closed gaps and pushed beyond previous limitations
- Boosted robustness
- Developed a new column technology
- Built the best UPHLC around the column/user
- Further leveraged our gold standard CDS software
- Boosted serviceability beyond established concepts

# Vanquish System Is...

## Confidence



### Controlling the separation with more confidence

- 2 thermostating modes
- 5 °C to 120 °C temperature range
- Active preheating

## Power



### Driving the separation with more power

- 1500 bar (22,000 psi) of pump pressure
- Flow rate up to 5 mL/min
- 2 × 3 solvent channels

## Sensitivity



### Detecting the analyte with more sensitivity

- Linear up to 3000 mAU
- Noise levels down to  $\pm 3 \mu\text{AU}$
- Lowest dispersion with Thermo Scientific™ LightPipe™ technology

## Accuracy



### Handling the sample with more accuracy

- Up to 23 well plates for up to 8832 samples
- Unsurpassed sample dosage
- Automation of workflows with barcode reading



# Vanquish System...Gives You More!



- Integrated modularity
- Viper-based, tool-free fluidic connections
- Biocompatible, iron-free flow path
- Support for latest innovations in column technology
- New column thermostating technology with up to 3 column compartments in one system
- Enhanced LC/MS support and integration
- Portable system control with tablet PC
- Reduced system height
- Revolutionary module drawer system for maintenance
- Removable doors for easy access

# Vanquish System...Provides More Solutions!



Better integration with the world's best mass spectrometers



Maximum speed and resolution with new Thermo Scientific™ Accucore™ Vanquish™ LC columns



More throughput capacity by new rack loader

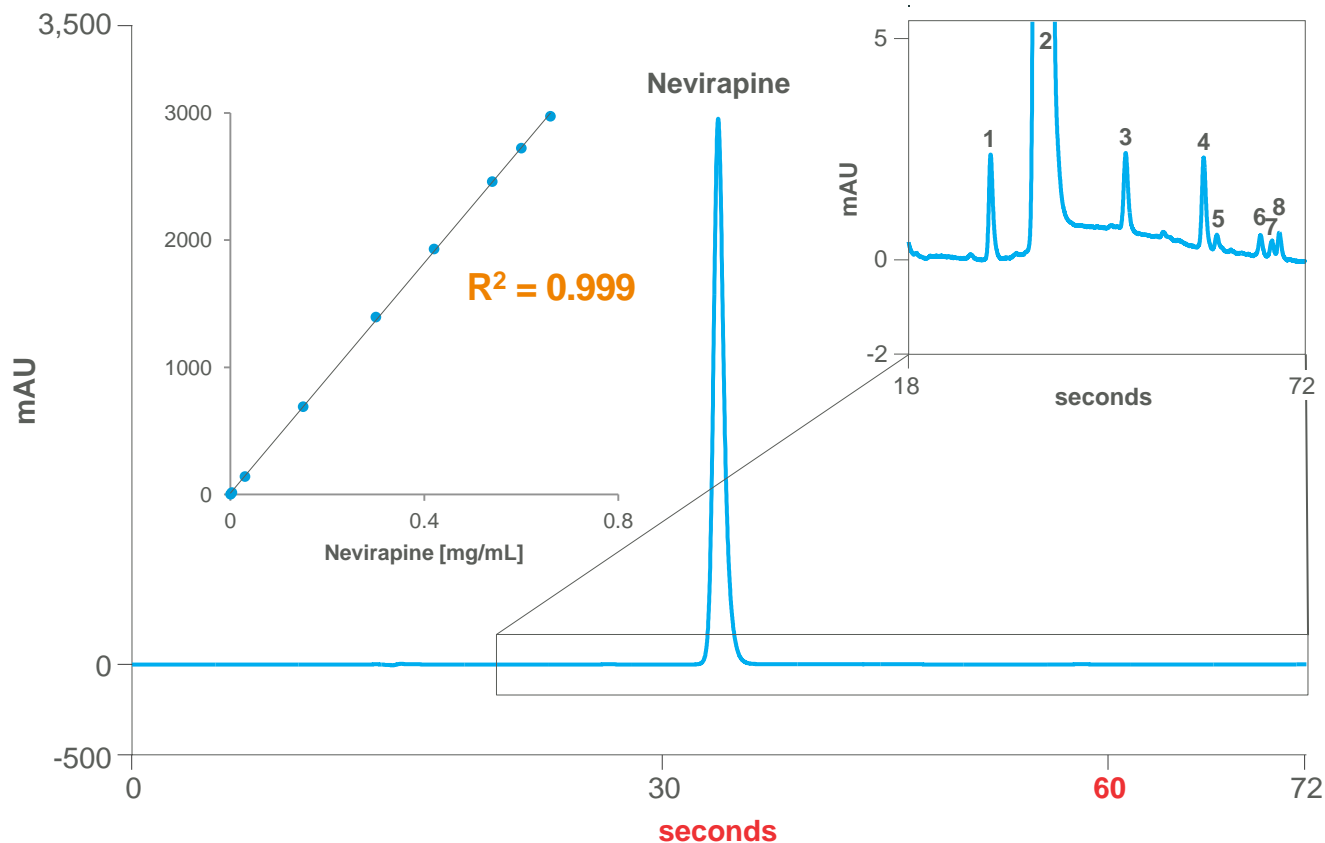


Revolutionary ease-of-use experience by new Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) features and workflows

# Vanquish System Delivers – Exceptional Sensitivity



## Nevirapine & Impurities on a Thermo Scientific™ Synchronis™ C18 Column, 1.7 μm, 2.1 × 100 mm



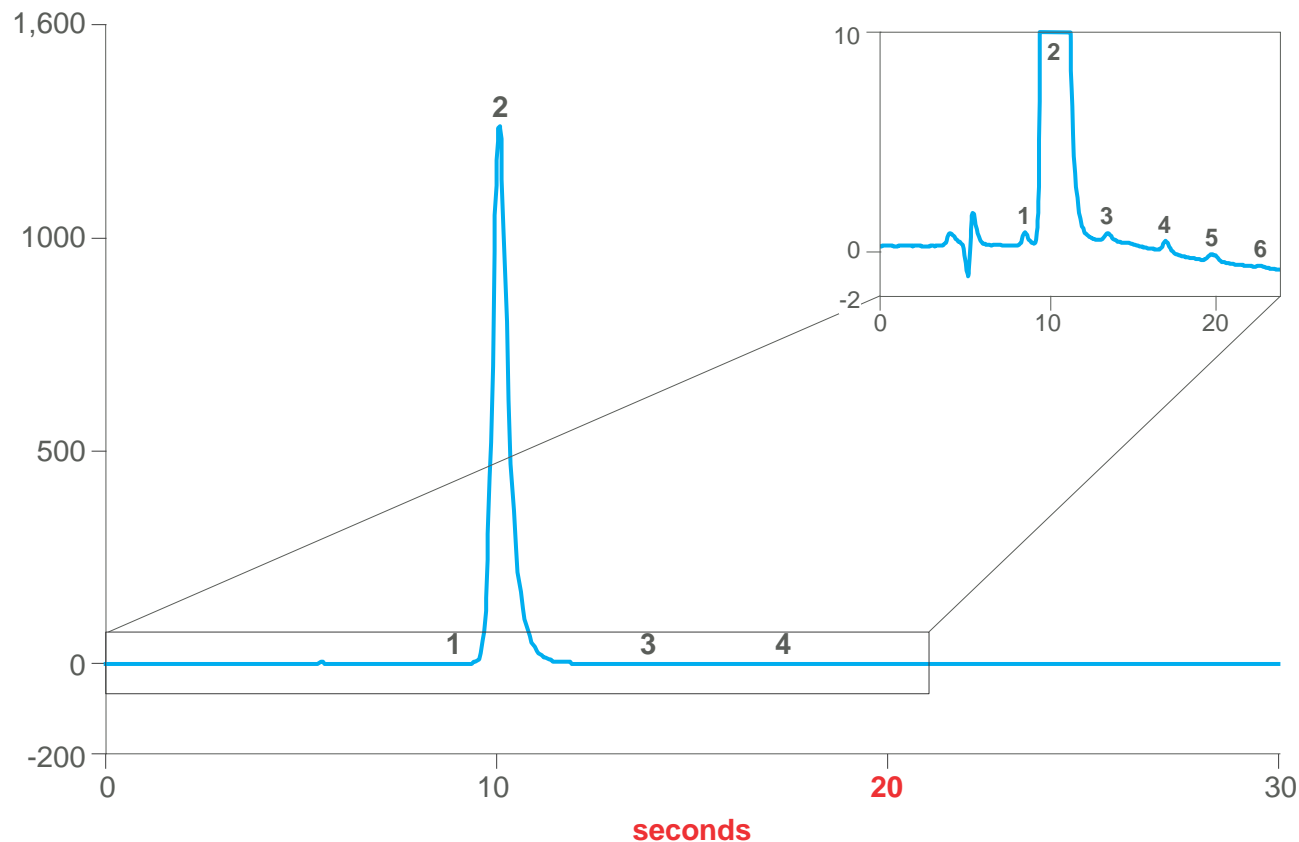
- Impurities as low as 0.008 % of the active ingredient (API)
- Exceptional linearity for API and impurities quantitation
- Very fast using 800 μL/min with 890 bar maximum pressure
- Easy method transfer from Thermo Scientific™ Dionex™ UltiMate™ 3000 XRS systems



# Vanquish System Delivers – Highest Throughput



**Nevirapine & Impurities on a Synchronis C18 Column,  
1.7  $\mu\text{m}$ , 2.1 mm  $\times$  50 mm**

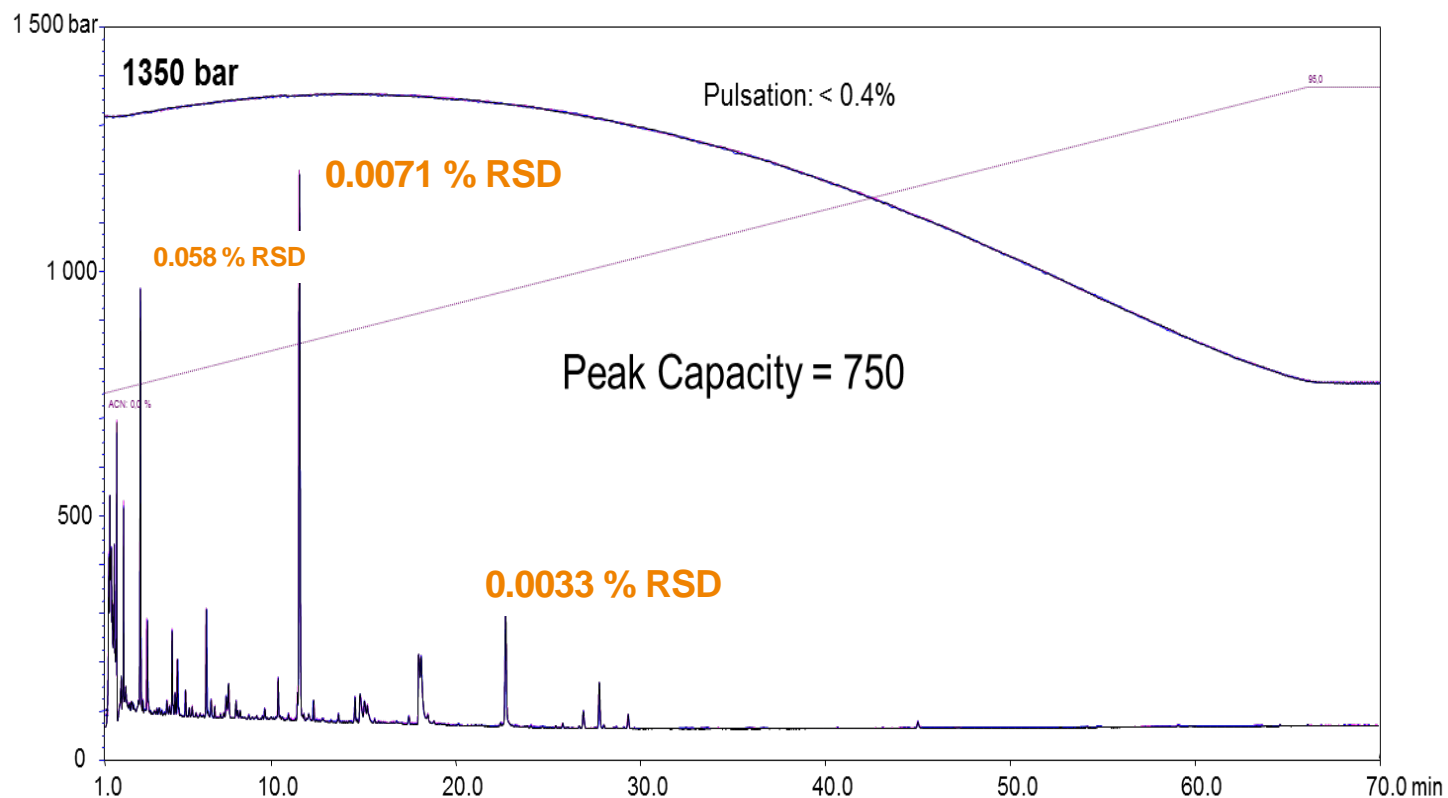


- Now double as fast than before with the same flow: 800  $\mu\text{L}/\text{min}$
- Impurities still better than 0.05% of the active ingredient
- Easy method speed-up by shortening the column

# Vanquish System Delivers – Outstanding RT Reproducibility



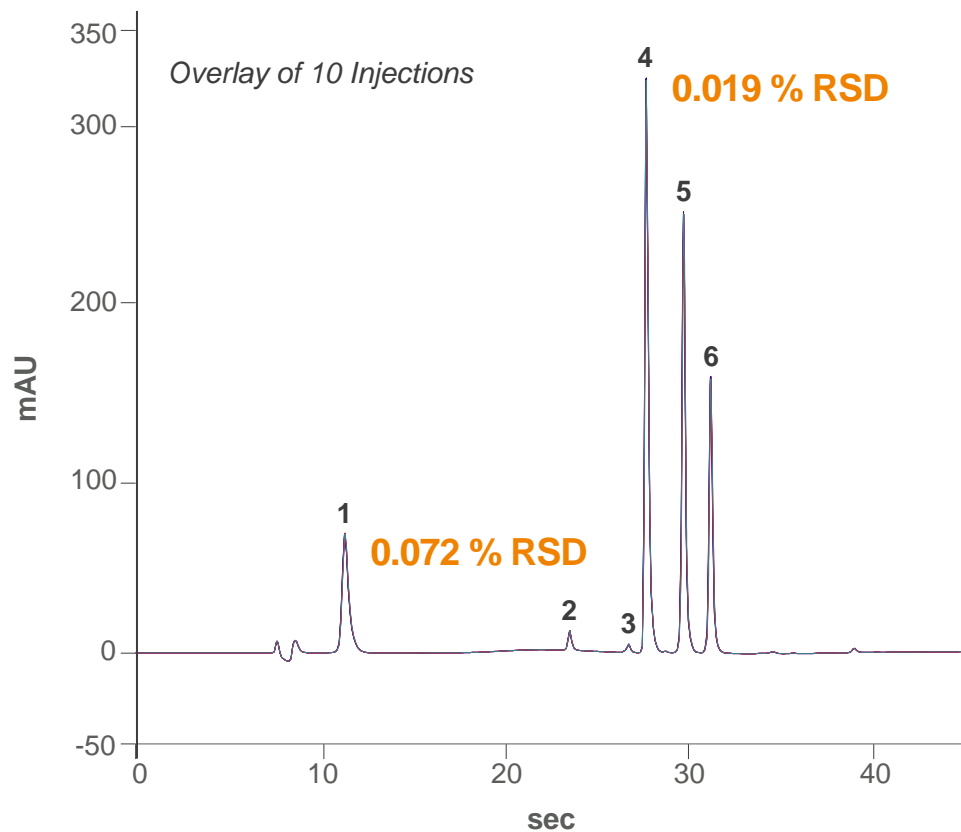
## Generic Exploratory Method for Traditional Chinese Medicine



Columns:	Thermo Scientific™ Acclaim™ RSLC C18, 2.1 × 250 mm and 2.1 × 150 mm coupled in line
Mobile Phase:	A–Water B–Acetonitrile
Flow rate:	670 µL/min
Pressure:	1350 bar (max.)
Temperature:	45 °C (still air mode)
Injection:	5 µL
Detection:	VDAD, 10 mm LightPipe data collection rate 100 Hz, 0.025 s response time, slit 4 nm



## Sartans & Diuretics on an Accucore C18 Column, 2.6 $\mu$ m, 2.1 $\times$ 100 mm



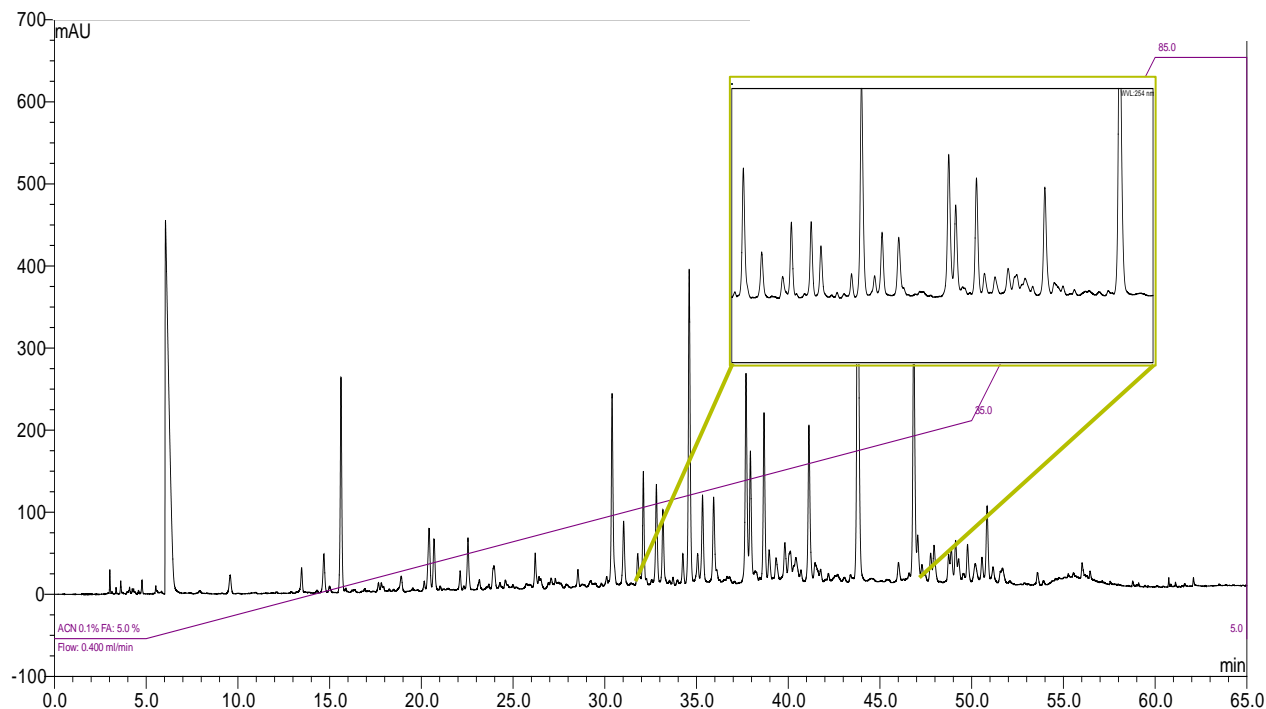
## Sartans and Diuretics

Column:	Accucore C18, 2.6 $\mu$ m, 2.1 $\times$ 100 mm
Mobile Phase:	A–Water, 0.1% formic acid B–Acetonitrile, 0.1% formic acid
Gradient:	0-0.14 min 5%-60% B, 0.14-0.30 min 60%-90% B, 0.30-0.75 min 90% B, 0.75-0.76 min 90%-15% B, 0.76 min-1.30 min 15% B
Flow rate:	1.50 mL/min
Pressure:	640 bar (max.)
Temperature:	60 $^{\circ}$ C (still air mode)
Injection:	3 $\mu$ L
Detection:	VDAD, 10 mm LightPipe, 272 nm, 100 Hz data collection rate, 0.05 s response time
Analytes:	Dissolved in 7% methanol 1. Hydrochlorothiazide 2. Chlorthalidone 3. Amlodipine 4. Telmisartan 5. Azilsartan 6. Valsartan



## Generic Exploratory Method for Herbal Extracts (i.e. Ginkgo extract):

2 coupled Acclaim RSLC C18 Columns, 2.2  $\mu\text{m}$ ,  
2.1  $\times$  250 mm  $\rightarrow$  500 mm effective column length

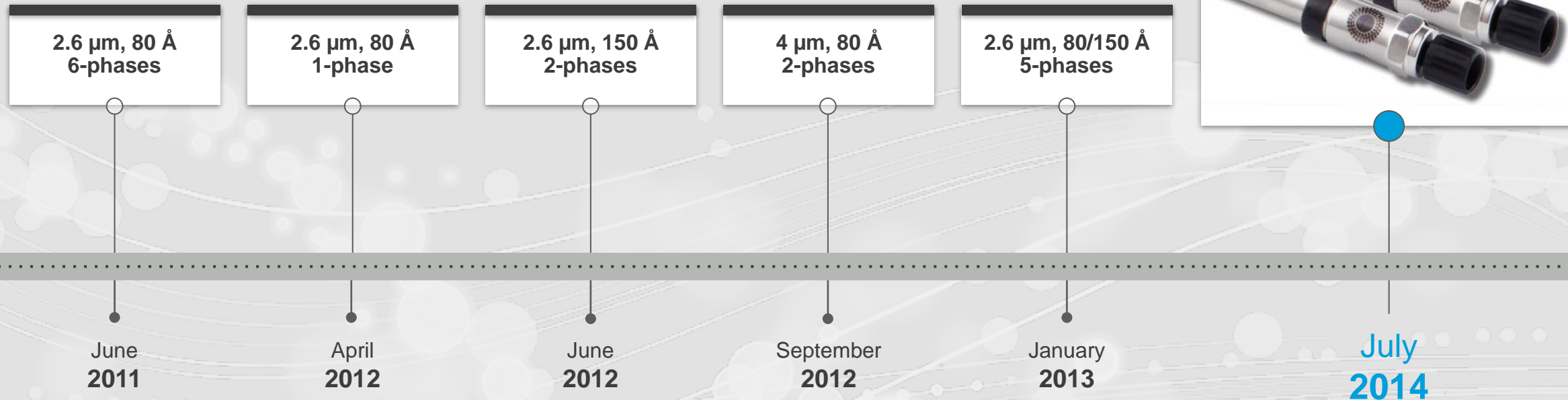


- Excellent sample loadability on long column setup reduces sample prep
- Perfect for exploratory, generic methods or very limited sample volume
- Highly reduced risk to miss peaks
- Full use of 1500 bar pressure capabilities (1370 bar, 400  $\mu\text{L}/\text{min}$ , 35  $^{\circ}\text{C}$ )
- Separation allows working with optimized MS scanning speed

# Accucore Vanquish Columns – New Column Technology

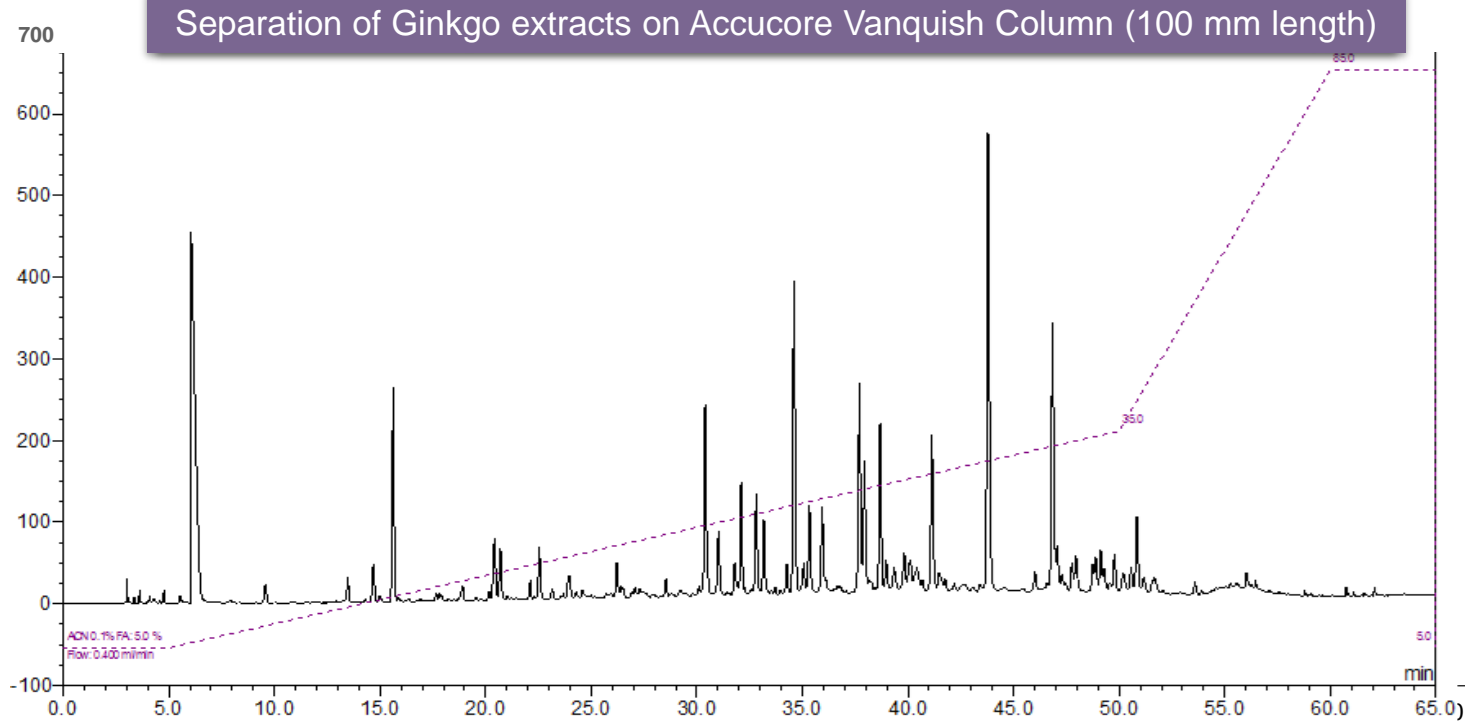
## Accucore Columns Range Summary

17 phases / 3 particle sizes / 2 pore sizes



# Vanquish System Delivers – Unmatched Performance

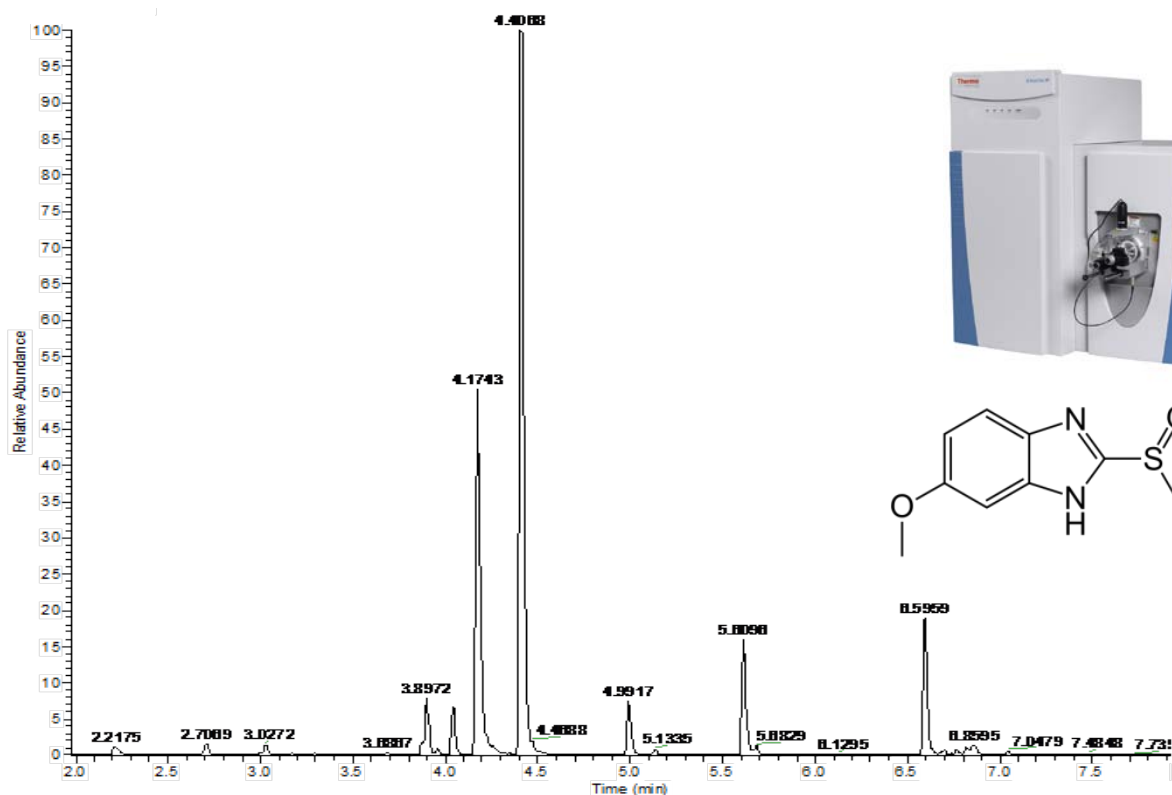
## Generic Routine Method for Herbal Extracts Ginkgo Extract on an Accucore Vanquish C18 Column, 1.5 $\mu\text{m}$ $\times$ 2.1 mm $\times$ 100 mm solid core



- Very similar peak pattern with 5 times shorter column
- Excellent method for QC and routine sample
- 4 times faster than exploratory method (75 min on 500 mm column vs. 18 min on 100 mm Accucore Vanquish Column)
- Higher and sharper peaks (4 sec vs. 12 sec)
- Easy method speed-up using outstanding flow and pressure capabilities (400  $\mu\text{L}/\text{min}$  at max. 850 bar)

# Vanquish System Delivers – Generic Methods for MS

**Full Scan Analysis of Omeprazole and Metabolites in Human Urine**  
on Vanquish UHPLC and Thermo Scientific™ Q Exactive™ HF Mass Spectrometer using  
Accucore Vanquish C18 Column, 1.5 μm, 2.1 × 100 mm



- Peak shape and sharpness allow better identification of structurally very similar metabolites
- Generic method power allows reducing method development
- Retention time reproducibility is extremely important for this work

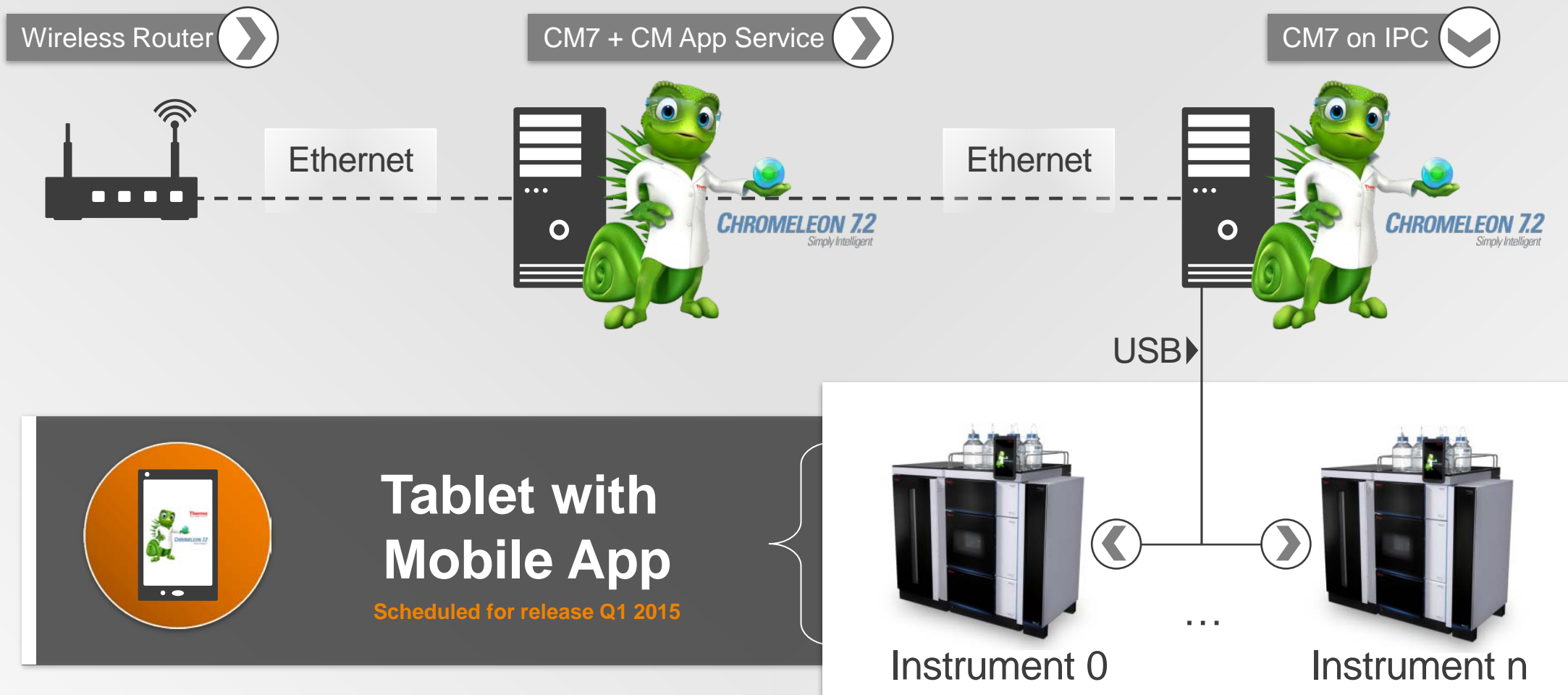
# Boosted Interaction with our Mobile App

- Mobile application to control your system and sequence
- A much more functional tool than instrument front panels
- An app even new users will love
- An app which will be able to interact with all Chromeleon 7.2 CDS operated systems
- Future options for data processing and virtualization





# Boosted Interaction with our Mobile App



# Explore the Vanquish System!

## Virtual Online Demo



Skip Demo

Offline Demo ▶

# Vanquish Binary Pump

1500 bar / 22 000 psi

Up to 5000  $\mu\text{L}/\text{min}$

New parallel dual piston principle

- Independent piston drives and variable stroke volume

Unmatched retention time performance

Lowest baseline noise using intelligent piston control

Ultra low GDV (as low as 35  $\mu\text{L}$ )

Thermal compensation (ATEC) compensates compression heat for lowest pulsation

2  $\times$  3 solvent channels

- 9 different solvent combinations

Finger tight check valve design



# Vanquish Split Sampler

Proprietary switching valve with “no maintenance” philosophy

Intelligent sample pre-compression

Biocompatible fluidics

Adjustable GDV for easy method transfer

New air-to-air cooling concept

- 4 – 40 °C

High throughput capabilities

Automated barcode features

Increased sample capacity with 4 racks or well plates

- min. 216 vials

Huge capacity with Vanquish Charger

- up to 20 well plates



# Vanquish Charger Module

Fully integrated robotic unit with less than 1 min cycle time

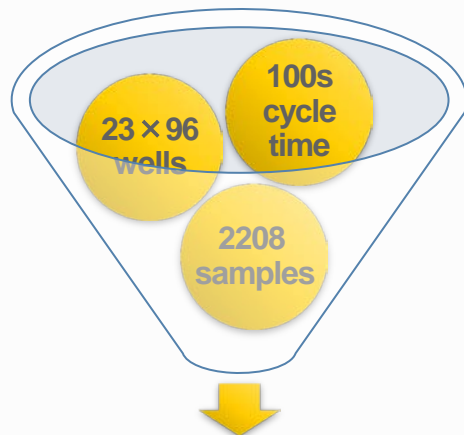
Hosts up to 9 additional racks/ deep well plates or 20 shallow well plates

Up to 9000 samples – temperature controlled

Precise temperature control using new designed air stream cooling concept

- 4 – 40 ° C

Integrated barcode reader



One weekend full of results



# Vanquish Column Compartment

Unique actively regulated Pre-Heater

- for perfect control of mobile phase and column temperature

Extended temperature range 5 – 120 °C

Two thermostating modes for easier method transfer and better peak shape management

- still air mode to boost separation speed and resolution
- forced air mode to enable seamless method transfer and mimic other column thermostats

Up to three independent column compartments

New column ID system



# Vanquish Diode Array Detector

LightPipe™ technology for an unmatched detection experience

- 10 mm standard flow cell
- 60 mm high sensitivity flow cell

Best signal-to-noise performance

Lowest baseline noise

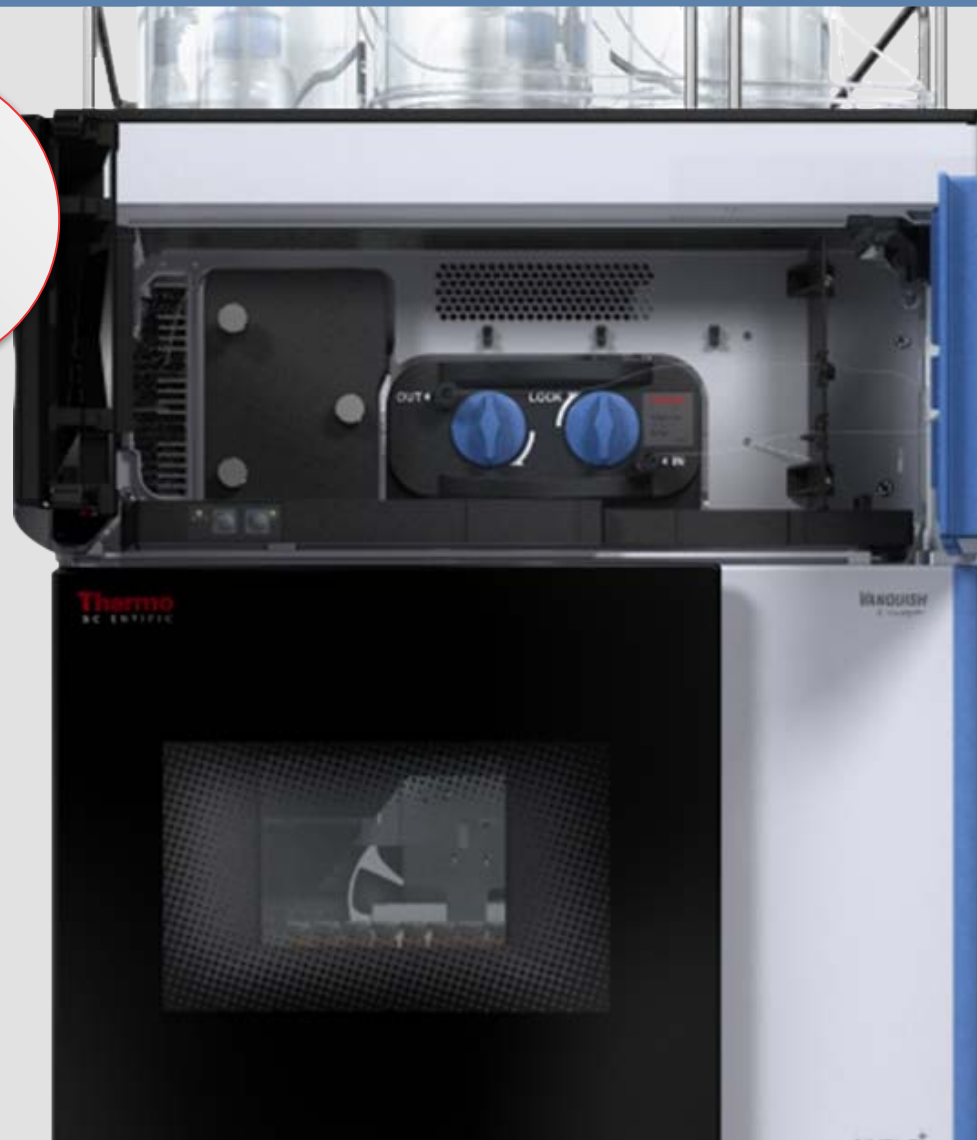
Ultra-wide dynamic range

- up to 3000 mAU
- for simultaneous detection of highly concentrated compounds and trace impurities

Variable slit width for optimum resolution  
1 – 8 nm

Low peak dispersion

Reduced RI and thermal effects



For more information please visit  
[www.thermoscientific.com/vanquish](http://www.thermoscientific.com/vanquish)



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