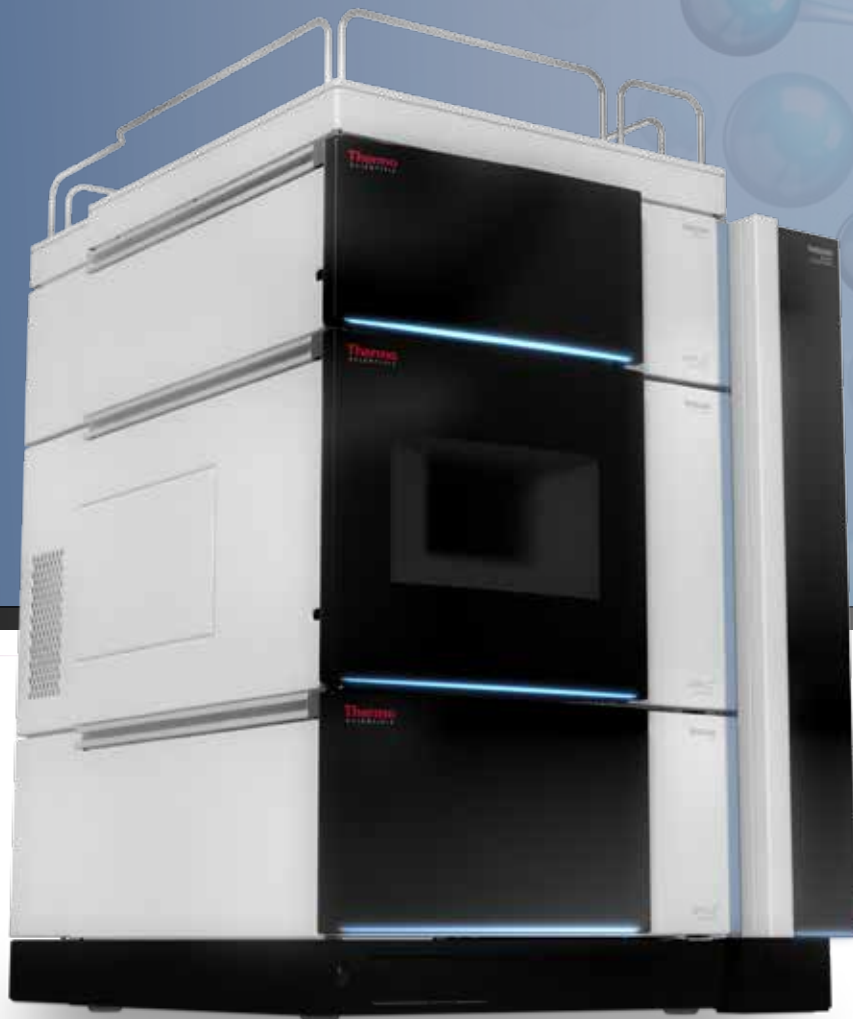




Thermo Scientific  
Vanquish UHPLC System

# Revolutionize Your UHPLC Experience

**Thermo**  
SCIENTIFIC



**UHPLC<sup>+</sup>**  
focused

We feel that achieving better performance is not the same as spending more effort. We know that every breakthrough starts with a challenge. We want that challenge to be your science, not your instrument.

Our mission is to let you find better answers, more answers, and get them faster. Make your life as a chromatographer easier by seeing what you couldn't see before and doing what you couldn't do before.

In 2010 we embraced UHPLC as the standard for all our liquid chromatography systems. Now we offer the Thermo Scientific™ Vanquish™ UHPLC system, combining all our knowledge and passion for chromatography into one revolutionary instrument.

# What is the Vanquish UHPLC System?

The Vanquish system was built around the column and the user to deliver better separations, more results, and easier interaction. The Vanquish UHPLC system is an integrated, fully biocompatible system, addressing the needs of chromatographers performing state-of-the-art UHPLC.

## The Vanquish system can ...



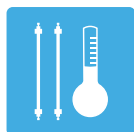
### ... drive the separation with more power

- 1500 bar (22,000 psi) of pump pressure at flow rates up to 5 mL/min
- Industry-leading flow and gradient precision
- 2 x 3 solvent channels



### ... handle the sample with more accuracy

- Up to 23 well plates for 8832 samples
- Excellent injections up to 100  $\mu$ L in 0.01  $\mu$ L increments
- Automation of workflows with barcode reading



### ... control the separation with more confidence

- 2 thermostating modes
- 5  $^{\circ}$ C to 120  $^{\circ}$ C temperature range
- Active pre-heating



### ... detect the analyte with more sensitivity

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

**...do more!**



## The Vanquish Promise



**You have**

*a method with a cycle time of 60 s*

**You need**

*to analyze 8000 samples*

**So you can enjoy**

***One weekend  
full of results***

**The Vanquish system can hold**

*up to 23 x 384 samples*

The Vanquish system takes high-end UHPLC to a new level, offering more resolution while meeting the throughput demands of modern laboratories. The system is driven by the gold-standard Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS) software and delivers better separations, more results and easier interaction. The Vanquish system delivers these values simultaneously, without compromise.

When combined with the Thermo Scientific Charger module, the Vanquish system allows for added sample capacity, performing the highest throughput UHPLC analysis. This setup combines enough sample capacity to run over the weekend, while Chromeleon CDS ensures convenient sample tracking and results processing of even the largest sample sets.

*There are many different questions in science, and all require a dedicated answer. The Vanquish system helps you to get that answer, every time.*



### Performance

## Better separations

Separate more peaks than ever before. The Vanquish system improves specifications on all fronts. It supports higher backpressures, better thermostating, optimized volumes, better linearity, and more sensitivity. The Vanquish system supports you without compromising performance while applying the most advanced column technologies, for all of your critical separations.



### Throughput

## More results

Regain time during your projects. The system improves analysis speed, increases sample capacity and has improved robustness. No longer fear the deadline — rely on the Vanquish system to take it head on.

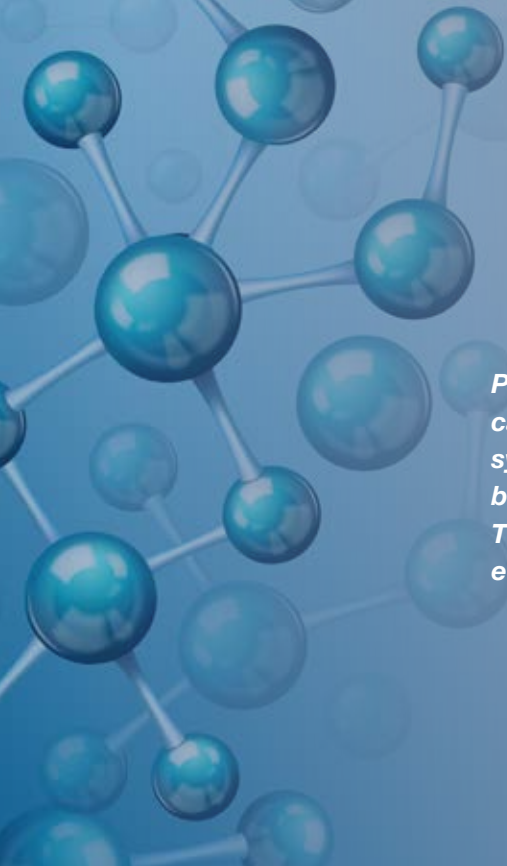


### Interaction

## Easier interaction

The Vanquish system has an optimized design, automated features and works with the operational simplicity of Chromeleon CDS, making the Vanquish system a true joy to work with.





*Pressure is only half the story in Ultra High Performance LC. How you can use the available power of 1500 bar is what separates the Vanquish system from the others. Maximize resolution or maximize throughput, both require a system that has more to offer than just high pressure. The Vanquish system was designed to work on both these ends and everywhere in between.*

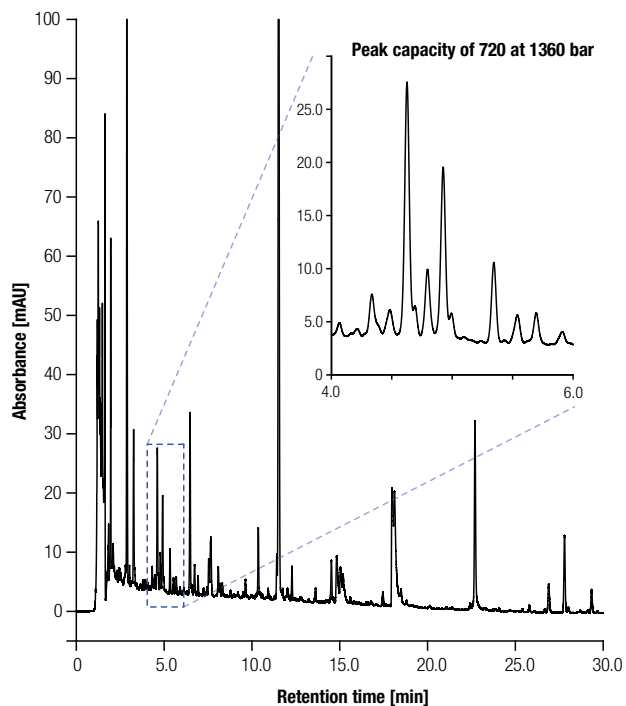
## Resolution Matters

### Better Separations

Take full benefit from the impressive power of the Vanquish system. Run your analysis on long UHPLC columns with ultra high-efficient sub-2  $\mu\text{m}$  particles or by applying column chains for maximum efficiency. The thermostating options in the column compartment will allow you to get that extra bit of resolution, so you can separate more compounds than ever before.

### Maintain Your Separation

The entire fluidic design needs to focus on the column as the core of separation. The Vanquish system by design has UHPLC in its genes. The low dispersion Thermo Scientific™ Viper™ fingertight fitting capillaries and optimized fluidic flow path translate the separation power of your column into superb chromatograms for a resolution that matters, plate for plate.



Ultra high peak capacity for a complex herbal extract analysis.

### Detect More

The most efficient separation is incomplete until you detect your compounds. The Vanquish detector will keep up with the speed of UHPLC separation and with its exceptionally large dynamic range and sensitivity, unveiling the full picture of your sample.



## Throughput Beyond Speed

### Never Run Out of Sample

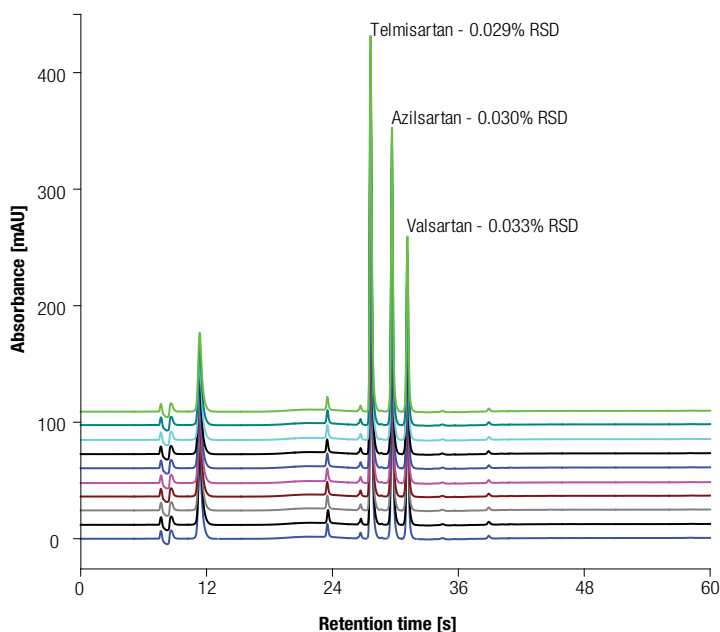
For throughput, you need more than fast chromatography. All the hardware needs to keep pace with the analysis speed. The Vanquish system injects your sample accurately and precisely with fast cycle times every time you need it. You can run large numbers of samples out of a wide range of sample vials and well plates, perfectly matching your sample volume demands. Count on the reliable bar code identification of the diverse racks and well plates by automated recognition and the accurate Charger module sample loading technology. Control the Vanquish system with ease by using Chromeleon CDS, the gold-standard in chromatography data system software.

### Run Faster

The Vanquish system features true ballistic gradients due to the perfect symbiosis of pumping control and smart fluidics for lowest gradient delays and exceptional gradient profile formation. The minimized system dispersion preserves chromatographic resolution even on short and slim high-throughput columns.

### Reproducibility Counts

You can only find answers when your results line up. The Vanquish system provides the reproducibility you need to compare results accurately, every single time.



Retention time precision — overlay of 10 consecutive injections of a sub-minute pharmaceutical screening application.

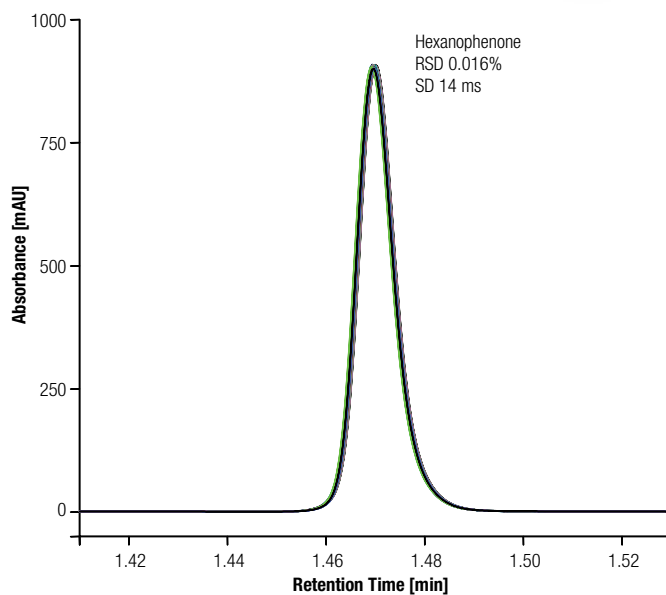
# Drive the Separation



The Vanquish system was developed to offer more pressure capabilities than ever before, without any tradeoff on durability or robustness. From ultra-fast to extremely shallow gradients at pressures up to 1500 bar, the industry-leading fourth generation SmartFlow™ pumping technology of the Vanquish system provides you with unmatched retention time reproducibility and lowest baseline noise for the highest detection sensitivity.

Profit from the perfect harmonization of pumping control and smart fluidics for lowest gradient delays and exceptional gradient profile formation.

- Rely on unmatched flow accuracy and precision with nanometer piston motion control
- Enjoy lowest pulsation up to 1500 bar (22,000 psi) by our Adaptive Thermal Effect Compensation
- Benefit from tool-free fluidics installation powered by Viper fingertight fitting technology
- Achieve maximum seal and piston lifetime by optimized stroke volume



Overlay of 69 injections of hexanophenone showing excellent retention time precision.



# Handle the Sample

The Vanquish system combines maximum injection precision with huge sample capacity and high-throughput capabilities.

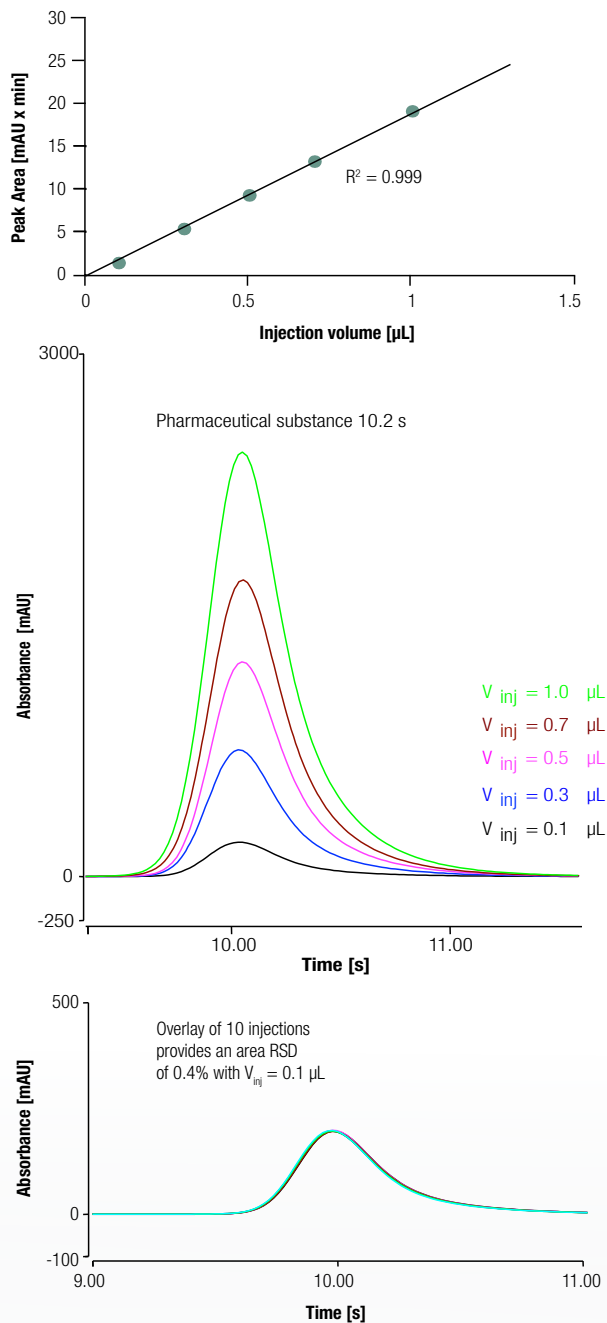
The fully biocompatible fluidics is consequently optimized for the highest ruggedness and uptime even under the toughest system pressure and eluent conditions.

- Rely on your results thanks to unsurpassed sample dosage precision
- Take advantage of maximum sample integrity by an innovative air stream cooling, even in challenging environments
- Enjoy incredibly easy method transfer and unlimited application flexibility by customizable gradient delay volume
- Forget about tedious sample configuration thanks to the automated barcode reader

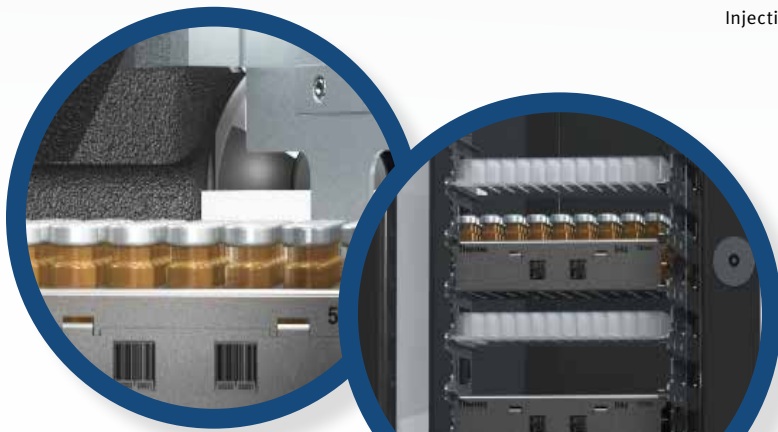
## Get more through the Chromeleon CDS driven Charger Module

This module is an intelligent, fully integrated robotic unit for environmentally controlled sample management and automated sample loading into the Vanquish system.

- Change your samples at any time while the barcode reader automatically inventories each plate or rack
- Monitor and manage reliably an inventory of up to 9 sample racks, deep well plates, or 20 shallow well plates (15 mm height) in SBS format



Injection linearity and precision of a pharmaceutical substance.





## Control the Separation

Temperature rules retention, selectivity and efficiency in chromatography. And the Vanquish system is your key to pave the way to maximum efficiency and resolution through an exceptional temperature control.

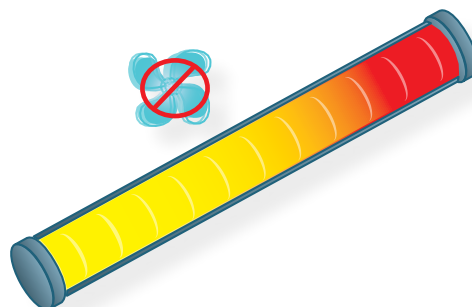
- Perfectly align eluent and column temperature by our unique active pre-heating concept
- Benefit from the unique choice between still air and forced air thermostating capabilities
- Extend your workflow capabilities with up to three independent column chambers and multiple switching valves
- Track your column records with the new column ID system fully integrated with Chromeleon CDS

### Why Temperature Control Matters

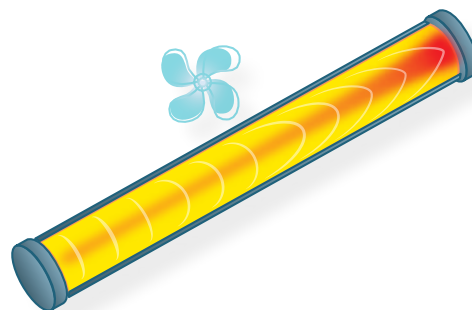
Hosting the LC column means much more than simply “hold and heat”.

Pressure and viscosity lead to frictional heat inside the column. This might interfere with the chromatography if not dissipated adequately.

The Vanquish column compartment is designed to offer two thermostating modes and their hybrid versions to match all application needs.



Ensure best efficiency by keeping the frictional heat within the column — boost your separation speed and resolution by still air thermostating.



Enjoy seamless method transfer by gaining constant separation temperature through removing frictional heat — use forced air thermostating to even mimic other column thermostats.

OUT

LOCK

**Thermo**  
SCIENTIFIC  
LightPipe • 60 mm  
HighSens flow cell  
[max: 6 MPa / 50 °C]  
P/N: 6083.0200  
S/N: 812345

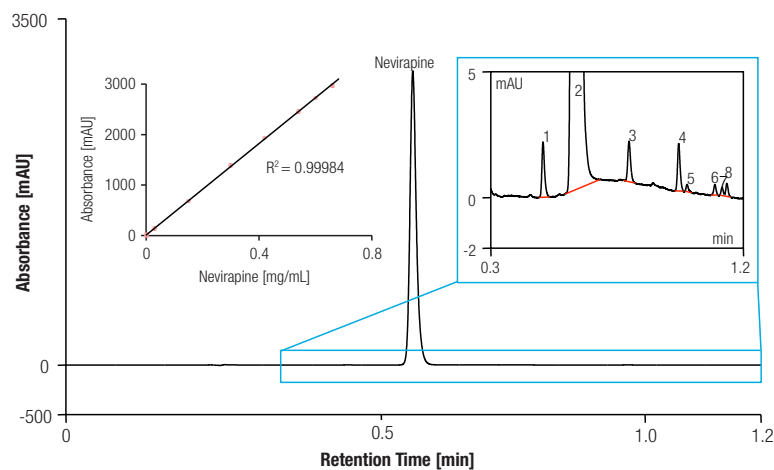
IN

## Detect the Analyte

The LightPipe technology within the Diode Array Detector (DAD) provides you with an unmatched detection experience. It achieves a wide linear range and industry-leading signal-to-noise performance, even beyond the capabilities of variable wavelength detectors.

- Benefit from the best sensitivity with low-dispersion 10 mm and 60 mm flow cells and a wide linearity to comply with even the most demanding applications
- Acquire simultaneously up to ten signal channels and a spectrum 3D field at 200 Hz
- Optimize sensitivity, linearity, and spectral resolution of your application with four programmable optical slit widths from 1 nm to 8 nm
- Exploit lowest baseline drift for best quantitation reproducibility. This is achieved through optimized fused-silica LightPipe flow cells and an effective thermal control.

As seen in the example, Nevirapine was used to demonstrate impurity profiling under challenging conditions. Even with a 1.2 min gradient separation at 100 Hz data rate, the assay allows quantitation ( $S/N = 10$ ) down to 0.008% relative area, which is well below ICH requirement of 0.050%.



High-speed pharmaceutical impurity analysis combining wide linear range and excellent sensitivity.

Peak No.	Compound	Signal-to-Noise	Area [%]
1	Impurity B	28	0.065
2	Nevirapine	17602	99.790
3	Impurity A	16	0.050
4	Impurity C	53	0.053
5	Impurity D	8	0.007
6	Impurity E	17	0.011
7	Impurity F	10	0.008
8	Impurity G	11	0.013

# Separate With Confidence

## Delivering Powerful Separations

Founded on state-of-the-art Core Enhanced Technology™ and utilizing vast experience in phase bonding and packing, Thermo Scientific™ Accucore™ Vanquish™ C18 UHPLC columns provide a unique chromatography solution to enhance laboratory workflow and productivity.

The Accucore Vanquish UHPLC column features 1.5 µm solid core particles, which provide ultra-short diffusion path lengths resulting in the most efficient separations.

- Get better separations for the most complex mixtures with the high efficiency of Accucore Vanquish UHPLC columns
- Achieve more separations while maintaining the efficiency at high flow rates

## Connections With Ease of Use

Viper fingertight capillaries revolutionize the way connections are made with UHPLC. Viper fittings pave the way for easy setup from the simplest to the most advanced column configurations, while providing virtually dead-volume-free chromatography to get the performance you require.

- Benefit from optimized fluidics with minimized dispersion for dramatically improved LC performance
- Enjoy fingertight connections with full confidence, even when working at up to 1500 bar



# Control Your Instrument



## The Gold Standard in Chromatography Data System Software

The Vanquish system is controlled by Chromeleon CDS. The operational simplicity is in full support of the easier interaction the system offers. The in-depth integration of the Vanquish system with Chromeleon CDS extends the Vanquish system's efficiency and performance benefits with smart start-up and shutdown functionality for unparalleled instrument uptime and sequence-ready and method compatibility checks, preventing typical analytical errors as well as tracking of every instrument parameter in audit-trails for an unmatched level of audit security.

- Monitor data acquisition live in the ePanel or sequence overview
- Protect your work from data loss during a network failure through secure Xvault
- Reduce the training effort for your lab staff with the intuitive workflows
- Use integrated mass spectrometry support for single point control of Vanquish LC-MS setups

## Direct Control

Today's world is connected, so why not extend this to your UHPLC system? As an accessory to the Vanquish system we provide a handheld tablet with a Chromeleon CDS App.

This App will let you see the instrument status, check runs, make changes if required, all from the tablet directly.

The Chromeleon CDS App will be available on all major mobile platforms.





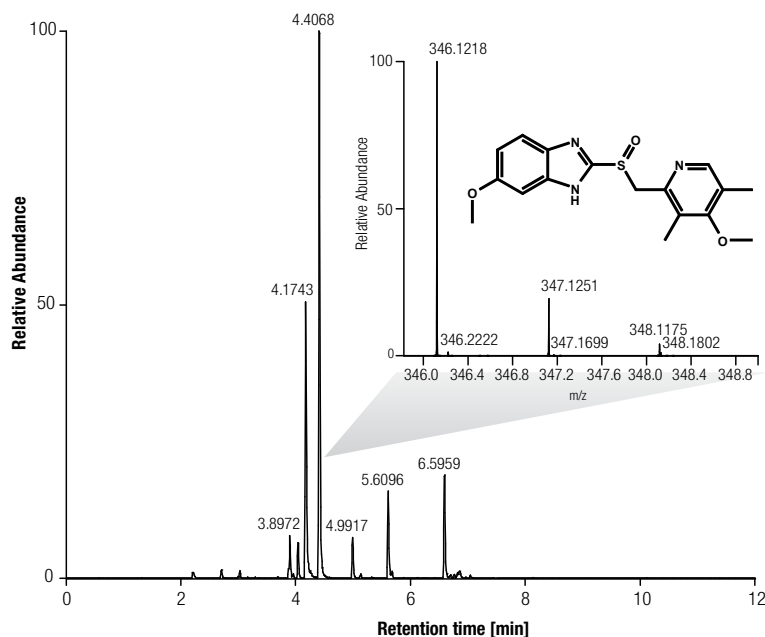
# Integrate Your Instrument



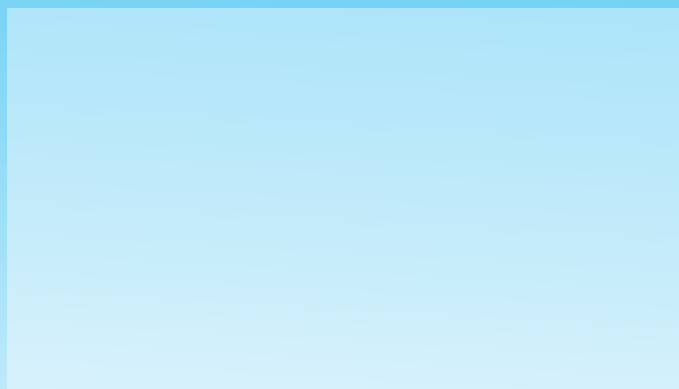
MS detection has become more affordable, accessible, and even mandatory in many fields of research. Only detecting a peak is no longer sufficient; you also need to know what compound you are looking at.

When the Vanquish system meets mass spectrometry, we combine our pioneering UHPLC system with our best-in-class mass spectrometers to provide that extra level of confidence.

The Thermo Scientific™ TSQ Endura™ and TSQ Quantiva™ Triple Quadrupole mass spectrometers are the perfect match for a wide range of quantitation workflows that utilize selected reaction monitoring (SRM) analyses. Alternatively, the Vanquish system is a great match for our unique Thermo Scientific™ Orbitrap™ technologies including the Thermo Scientific™ Exactive™ line of benchtop mass spectrometers or the revolutionary Thermo Scientific™ Orbitrap Fusion™ Tribrid™ mass spectrometer to take full advantage from all the benefits of high-resolution, accurate mass detection by LC-MS.



Full scan LC-MS analysis of Omeprazole and metabolites in human urine on a Vanquish UHPLC and Q Exactive Plus LC-MS system.



Scan the QR code or follow the link below for a virtual demo of the system, videos, resources, and much more.

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

[www.thermofisher.com/vanquish](http://www.thermofisher.com/vanquish)

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