ThermoFisher
SCIENTIFIC

Vanquish Neo UHPLC System

Beyond brilliant

thermo scientific


1345 bar
300 nl/min
80.0 %
R:A1
1.00 µl
8.0 °C
thermo scientific
Vanquish
Autosampler
thermo scientific
Vanquish
Pump

The new standard in nano-, capillary- and micro-flow LC

For researchers pursuing the next scientific breakthrough, the Thermo Scientific™ Vanquish™ Neo UHPLC system offers the highest performance, productivity and usability of any nano-, capillary- and micro-flow UHPLC system.

Beyond discovery

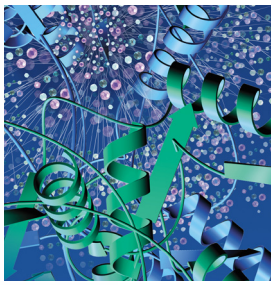
All-in-one nano-, capillary- and micro-flow LC for high-sensitivity LC-MS workflows.

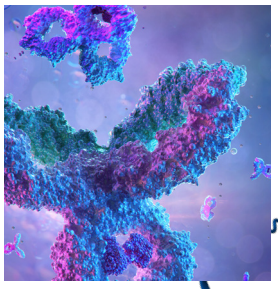
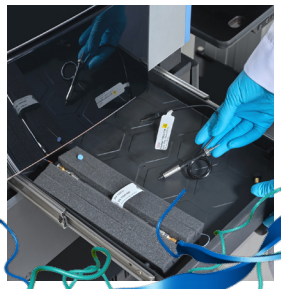
Beyond innovation

Accelerating productivity with long-term, trouble-free operation at maximum performance.

Beyond possibilities

Enabling LC-MS experts and novice users to get high-quality results, every time.

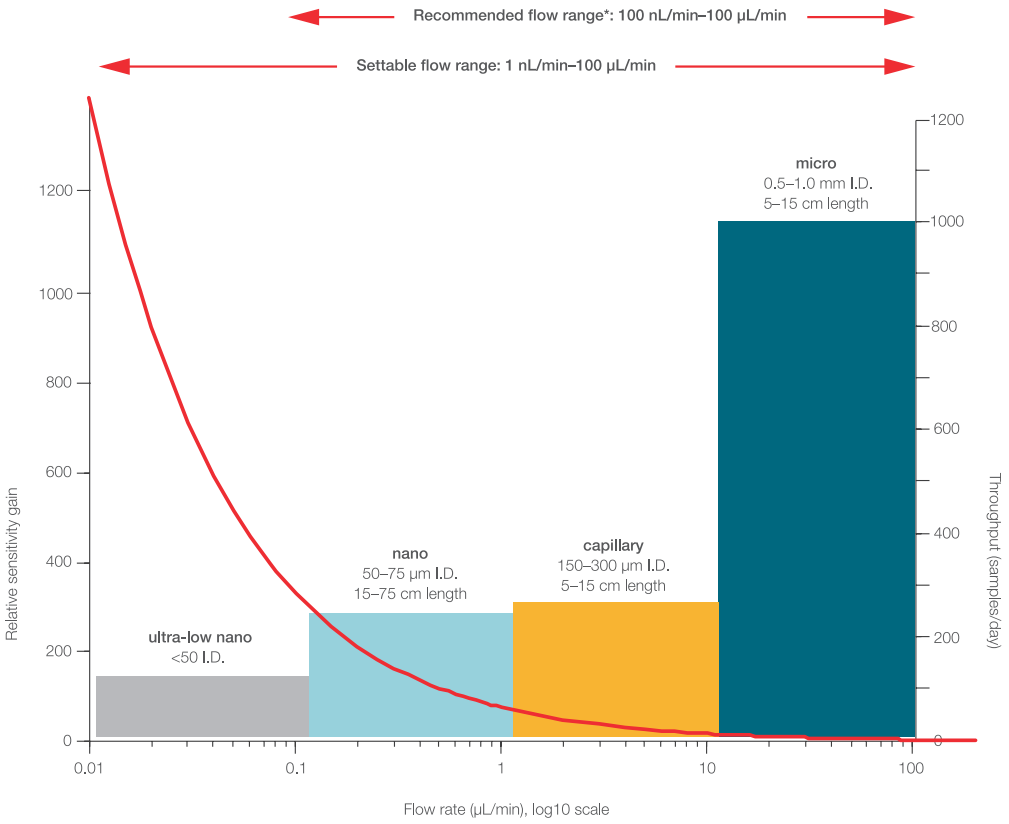



All-in-one low-flow UHPLC system

Discover more in every sample with excellent system performance and unmatched retention time precision for shallow gradients, high-throughput applications and anything in between. Vanquish Neo is the first UHPLC system built not only to operate, but to excel across the entire low-flow range ideal for LC-MS applications.

- Thermo Scientific™ ProFlow™ XR active flow control for robust operation from nano up to 100 µL/min flow without pump hardware changes
- Factory multi-point flow calibration for precise and reproducible flow delivery of standard solvent blends
- Ultra-low 0.5 µL gradient delay volume (GDV) maintains efficiency and helps ensure rapid gradient delivery for maximum sample throughput



The Vanquish Neo UHPLC system delivers flow rates from 1 nL/min to 100 µL/min to support a broad range of high-sensitivity LC-MS workflows. Sensitivity gain (red trace) relative to a 2.1 mm I.D. column operated at 450 µL/min corresponds to increased electrospray ionization efficiency at lower LC flow rates. The Vanquish Neo UHPLC system permits maximum sample throughput for a broad range of low-flow columns and applications (colored bars).

* Within specifications for retention time precision (≤0.2 % RSD or ≤0.1 SD).

Enabling precise temperature control

Ideal for micro-flow LC-MS applications, the optional Vanquish Neo column compartment provides stable temperature control for linear columns, coiled capillary columns and trap columns.

Versatile high-sensitivity LC-MS workflows

From maximizing peptide identifications in discovery proteomics to high-throughput precision medicine, the Vanquish Neo UHPLC system was designed with the versatility to tackle all your high-sensitivity analyses.

- Industry-leading flow-pressure footprint enables high-resolution separations on ultra-long columns, high-throughput analysis on 1.0 mm I.D. columns and ultra-high sensitivity analysis on 75 µm I.D. columns without changes to pump hardware
- Optimized configurations, including direct, tandem direct and trap-and-elute injections, improve productivity and help ensure superior performance within a broad range of LC-MS workflows

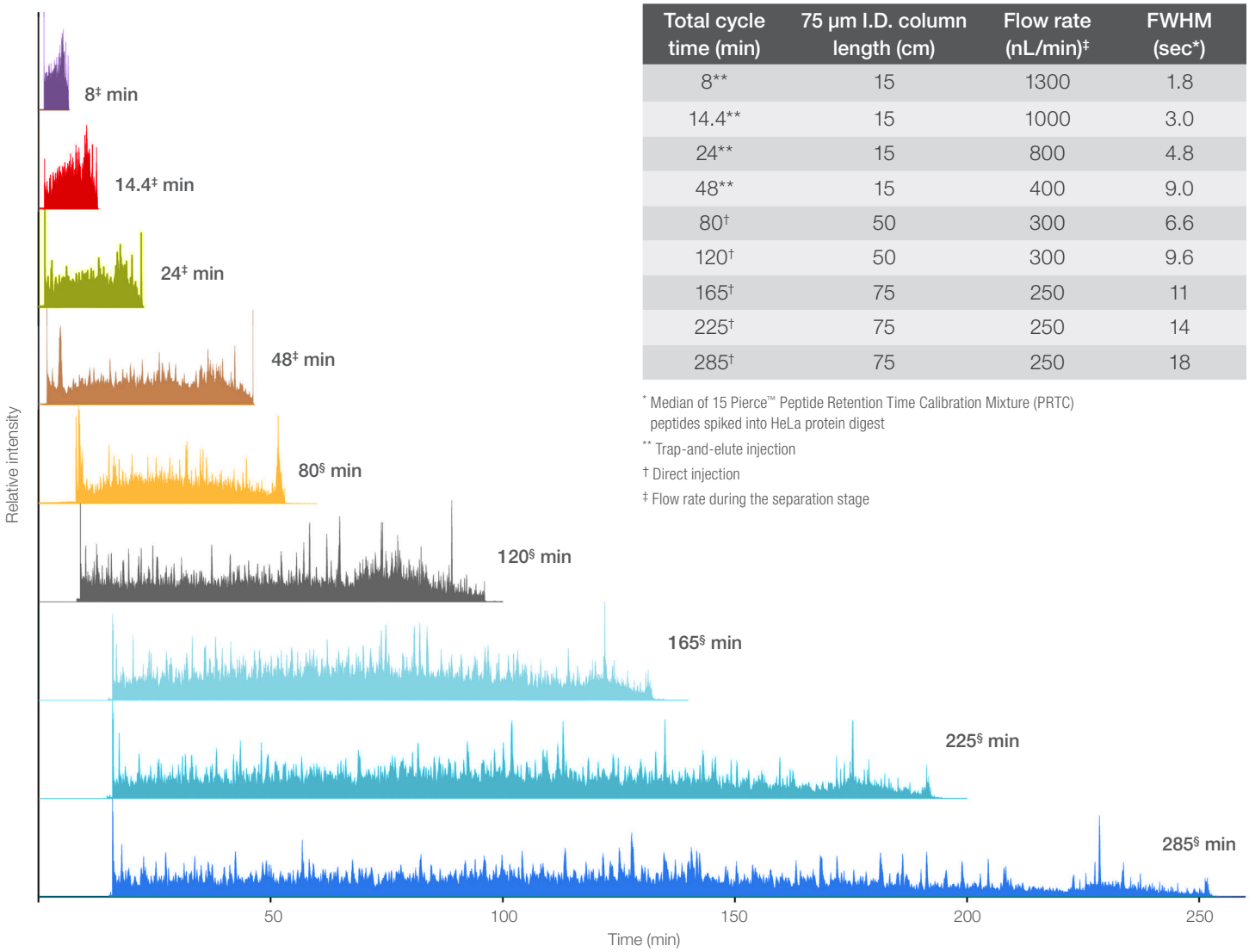
Total cycle time (min)	75 µm I.D. column length (cm)	Flow rate (nL/min)‡	FWHM (sec*)
8**	15	1300	1.8
14.4**	15	1000	3.0
24**	15	800	4.8
48**	15	400	9.0
80†	50	300	6.6
120†	50	300	9.6
165†	75	250	11
225†	75	250	14
285†	75	250	18

* Median of 15 Pierce™ Peptide Retention Time Calibration Mixture (PRTC) peptides spiked into HeLa protein digest

** Trap-and-elute injection

† Direct injection

‡ Flow rate during the separation stage

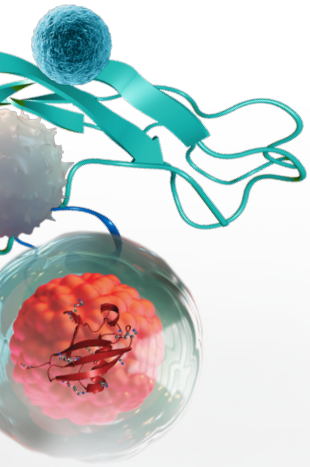


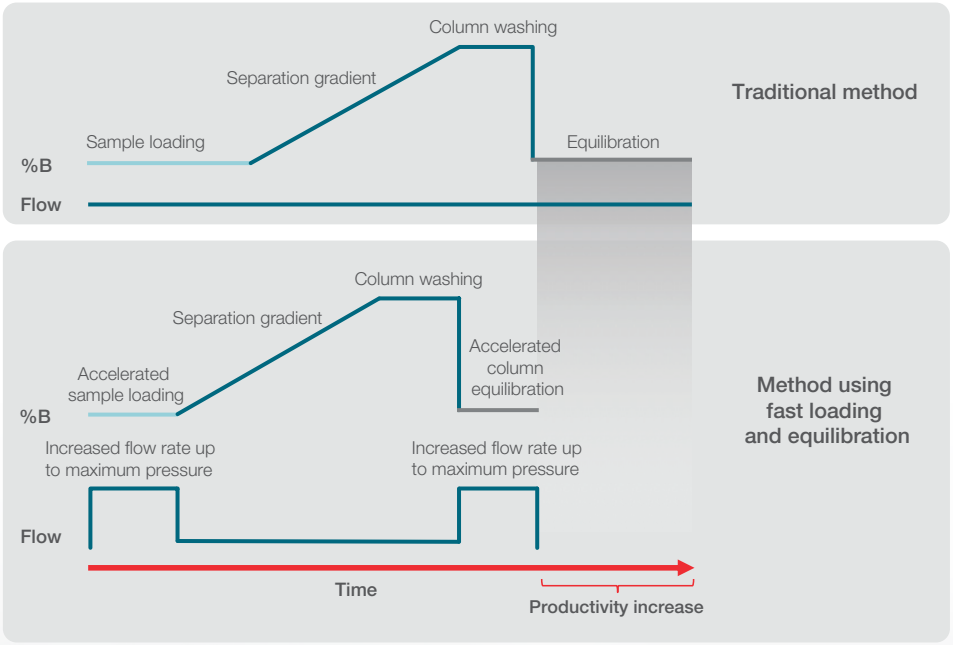
The Vanquish Neo UHPLC system supports a broad range of flow rates and gradient lengths without any changes to pump hardware. For all runs, 1 µg of HeLa protein digest was separated on a Thermo Scientific™ EASY-Spray™ PepMap™ Neo column by a Vanquish Neo UHPLC system interfaced to a Thermo Scientific™ Orbitrap Exploris™ 480 mass spectrometer operated in data dependent acquisition mode.

Accelerate productivity

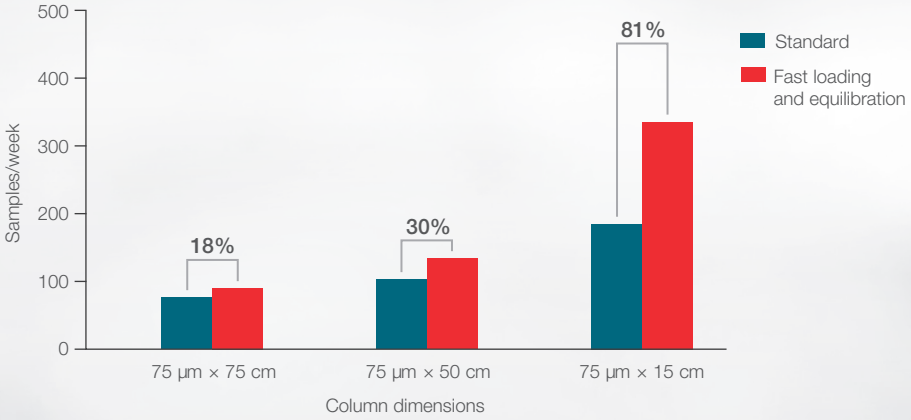
In your lab, system performance and productivity shouldn't be at odds. The Vanquish Neo UHPLC system enables you to consistently generate high-quality data while maximizing MS utilization.

- High-pressure capabilities and an ultra-low GDV help ensure maximum sample throughput for a broad range of column diameters and lengths
- Fast sample loading and column equilibration reduce overhead time and improve MS utilization
- The tandem direct injection workflow further improves MS utilization through parallel sample loading and column regeneration





Fast sample loading and equilibration increase system productivity.

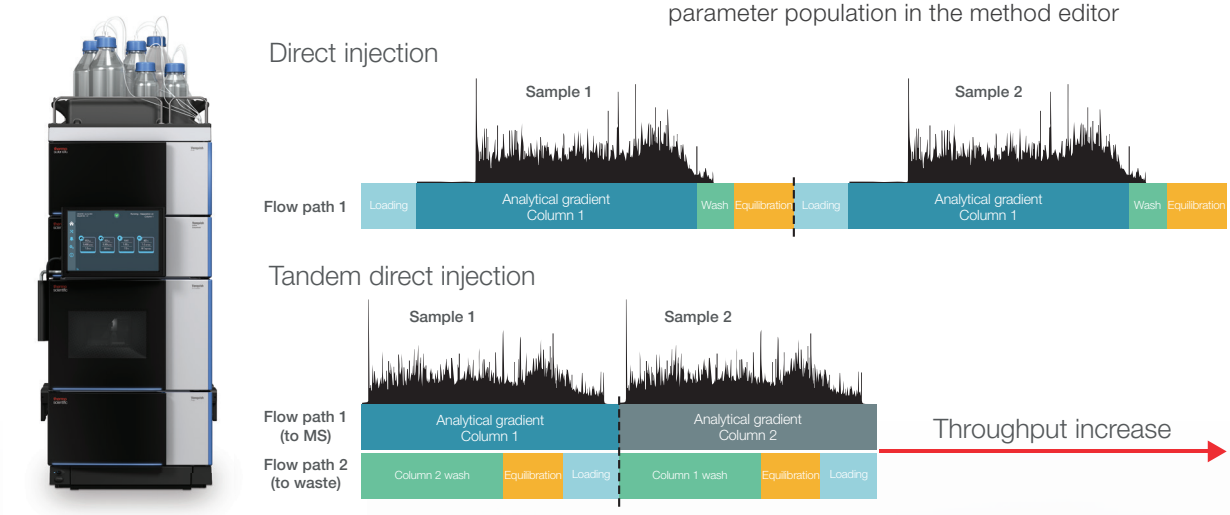


Comparison of sample throughput with and without fast sample loading and column equilibration. Estimated increase in sample throughput ranges from 18–81%, depending on column dimensions.

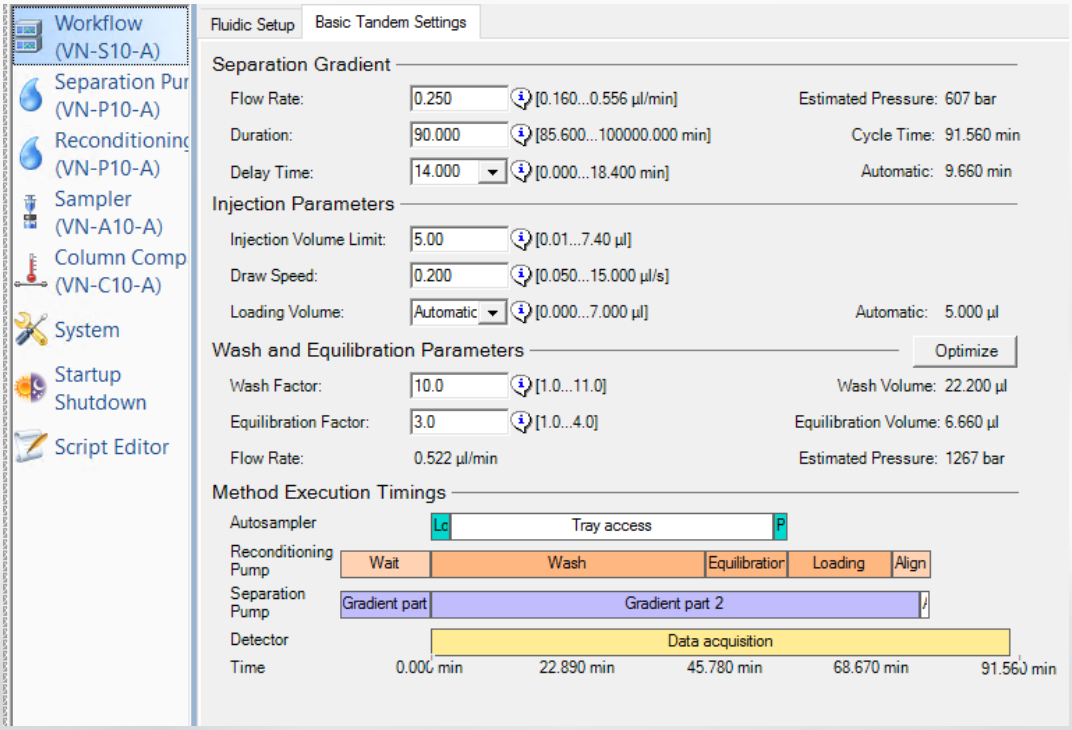
High-quality separations, faster

In addition to fast sample loading and equilibration, the Vanquish Neo UHPLC system tandem direct injection workflow pushes your analyses even further by eliminating method overhead. Utilizing a two-pump, two-column configuration, the workflow performs column loading, washing and equilibration offline and in parallel to the analytical gradient to offer:

- Increased sample throughput while maintaining data quality—by maximizing MS utilization, the total method cycle time is decreased for a given gradient length
- Reduced column carryover, extended column lifetime, and improved retention time reproducibility through extended washing cycles, which feature multiple, pre-programmed washing patterns
- Simplified user experience and seamless workflow execution through step-by-step configuration guidance and automatic parameter population in the method editor



The tandem direct injection workflow operates using a second flow path for offline column washing, equilibration and loading.

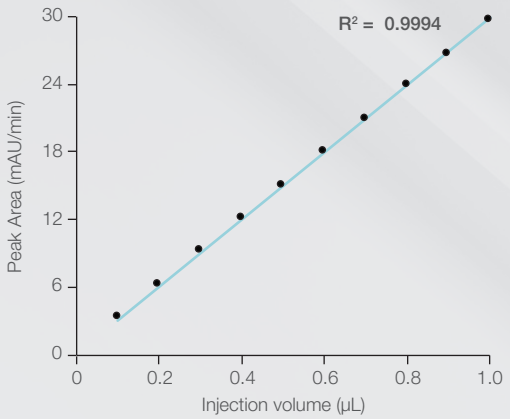


The instrument method editor wizard, available with Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) and Thermo Scientific™ Standard Instrument Integration (SII) for Xcalibur, provides automatic parameter population and determination of method execution timings to help ensure seamless transfer of methods to tandem direct injection.

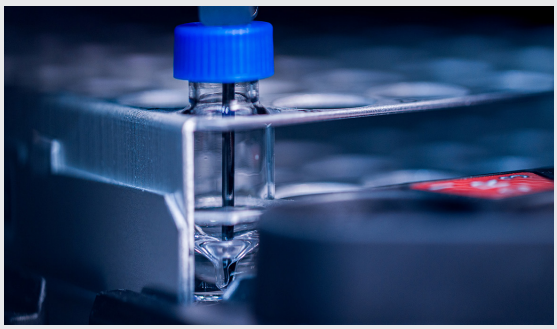
Maximize performance

Built from the ground up in order to redefine the low-flow chromatographic system, the innovative Thermo Scientific™ Vanquish™ Split Sampler NT provides superior sample injection performance.

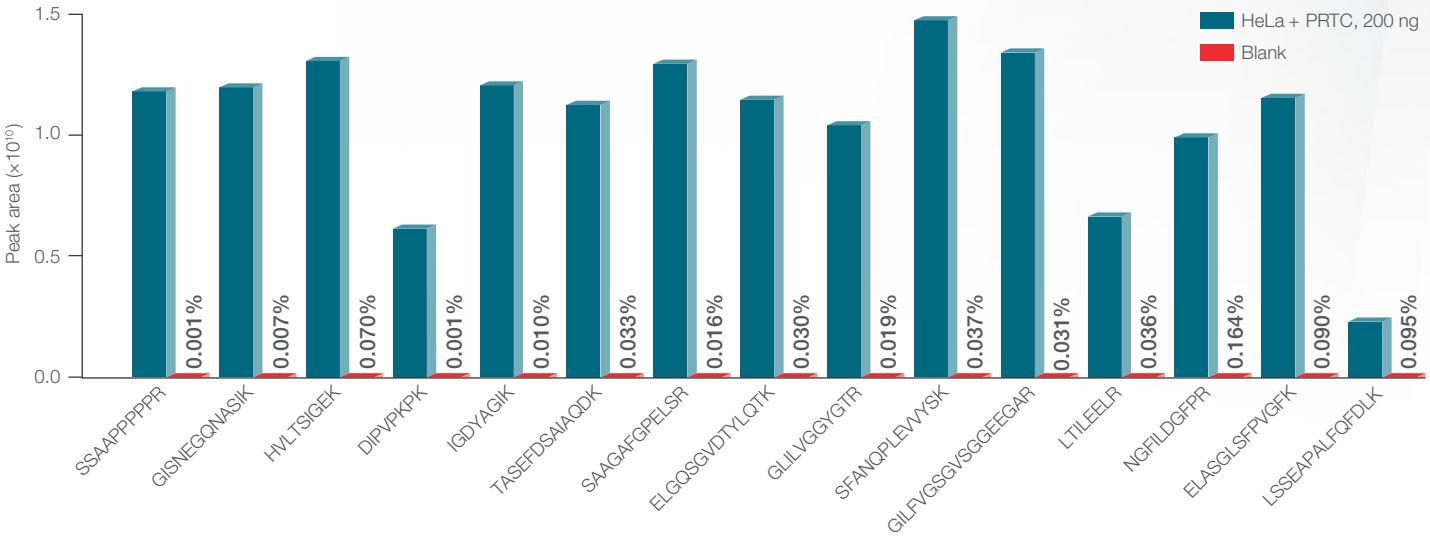
- Unique low-flow split-loop autosampler design limits sample dispersion, system carryover and sample usage to maximize sensitivity and data quality
- Novel valve and fluidic designs help ensure low gradient delay volume for increased system productivity
- Metering device delivers wide injection volume linearity, high injection volume precision and accuracy, and multi-draw capabilities for enhanced quantitation
- Multi-wash injection routines minimize system carryover for improved sensitivity of low-level analytes
- Vial bottom detection technology enables precise and accurate injection from limited sample volumes, decreasing sample waste



Injection volume linearity of a caffeine standard from 0.1 to 1.0 µL using flow injection analysis.



Vial bottom detection technology enhances injection volume linearity and precision while minimizing waste of limited samples.



Carryover for 15 PRTC peptide standards spiked into HeLa protein digest. 200 ng was injected onto a 75 µm I.D. × 75 cm column followed by a blank injection using a Vanquish Neo UHPLC system coupled to an Orbitrap Exploris 480 operated in data dependent acquisition mode. Percent carryover is listed above the peak area for each blank injection. The flow rate was 250 nL/min during the separation phase.

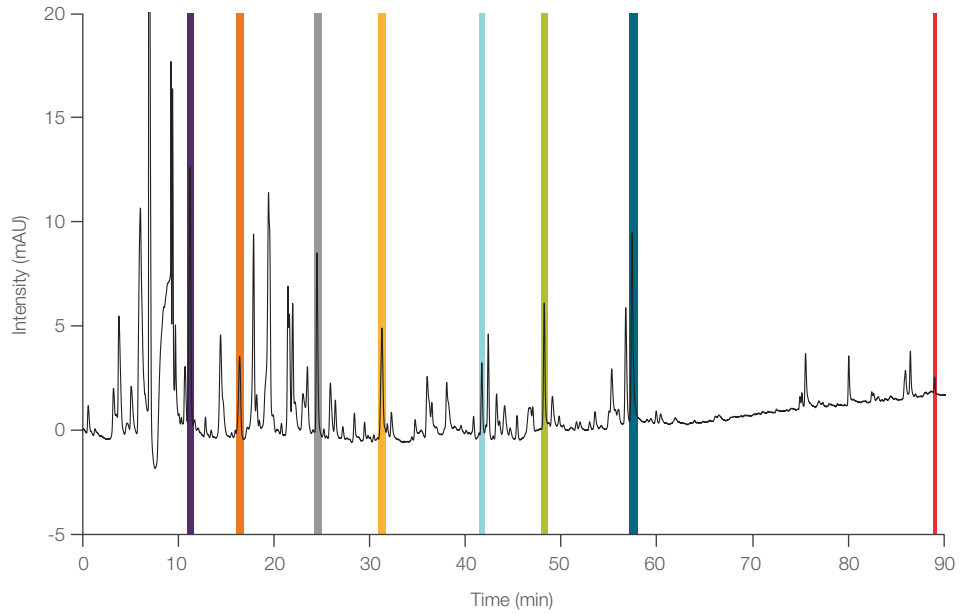

H2O-0
CN-0.1%F
thermo
scientific
thermo
scientific
thermo
scientific
18:04:55 | 2021-JAN-22
| vsc-6400146 | 1.8.0.43189
843.9 bar
0.305 µL/min
25.3 %B
Y:F9
1.00 µL
7.0 °C
18:04:59 | 2021-JAN-22
| vsc-6400092 | 1.8.0.43036
R:A1
1.00 µL
27.0 °C
0.0 bar
0.007 µL/min
28.8 %B
B:A1
0.50 µL
7.0 °C

Long-term, trouble-free LC-MS analysis

Modern proteomics, lipidomics, metabolomics, translational research and bioanalysis depend on LC-MS instrumentation capable of identifying and quantifying subtle analyte concentration differences across large sample cohorts. The Vanquish Neo UHPLC system instills confidence in your results by delivering efficient separations 24/7 without compromising robustness.

- Improved column lifetime and retention time precision with SmartInject technology
- Reduced cost per sample through decreased downtime, less maintenance and lower solvent consumption and waste generation
- Thermo Scientific™ Viper™ and Thermo Scientific™ nanoViper™ fittings help ensure near-zero dead volume, leak-free connections

A



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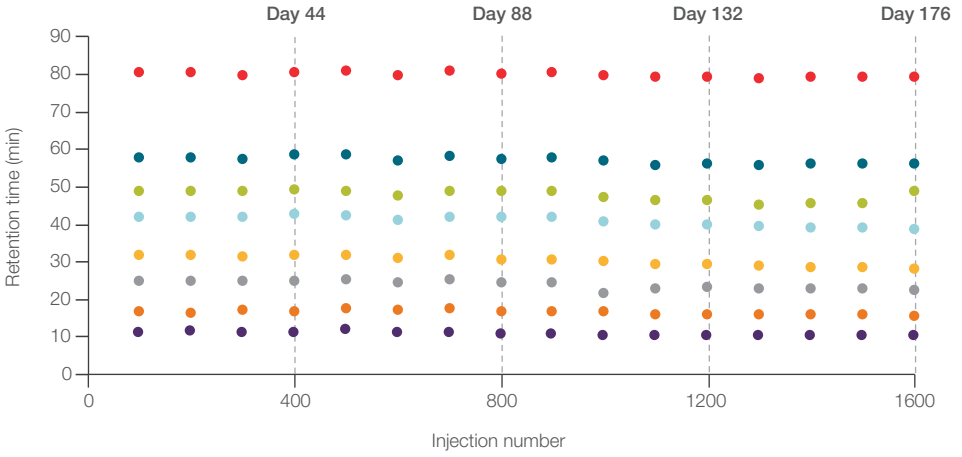
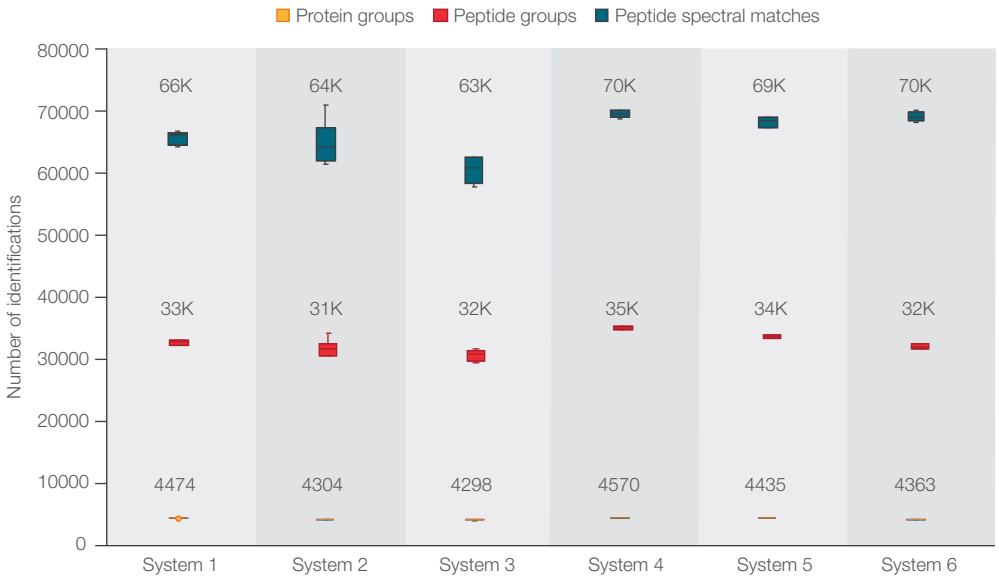


8 peptides were selected from a 90 minute gradient separation of 1 pmol BSA protein digest performed at 300 nL/min with the system configured in direct injection mode (A). Retention time stability was monitored for the selected peptides over a period of 176 days. In total, 1600 injections were performed using 1500 bar system pressure for sample loading and column equilibration (B).

Confidence in your results

Every Vanquish Neo UHPLC system is designed and rigorously tested to guarantee high-quality separations and system-to-system reproducibility, both within labs and around the globe. Standardized configurations improve your user experience throughout the instrument's lifetime.

- Factory pre-assembled, configured, calibrated and tested during the production process for fast installation, enabling you to perform high-quality separations from day one on all Vanquish Neo UHPLC systems
- Slide-in pump and autosampler modules simplify maintenance while the built-in tool and consumable drawer enhances convenience
- Capillary, solvent and waste line guides for trouble-free connections



Results of 200 ng HeLa protein digest profiling with 6 different Vanquish Neo UHPLC systems coupled to Thermo Scientific™ Orbitrap Exploris™ 240 systems. Used 75 µm × 50 cm, 2 µm EASY-Spray PepMap Neo column, 90 min gradient, 300 nL/min flow rate, direct injection, 1500 bar sample loading and column equilibration.

Viper and nanoViper fittings

The Vanquish Neo UHPLC system is equipped with Viper and nanoViper fittings for leak-free operation up to 1500 bar, preventing time-consuming troubleshooting of system fluidics. Viper capillaries limit extra column dispersion by utilizing a PEEK tip seal and bushing instead of a traditional ferrule for improved separation performance. All 1500 bar nanoViper fittings are biocompatible and offer high capillary-to-capillary reproducibility.

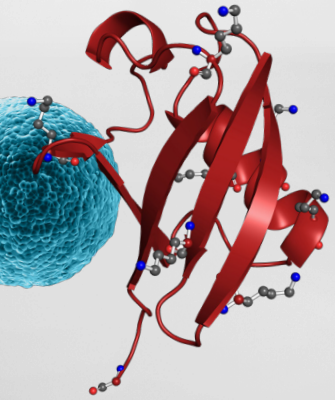
Superior usability

The Vanquish Neo UHPLC system delivers uncompromised results to expert LC-MS users while expanding the toolbox for novice users for nano-, capillary- and micro-flow LC-MS applications. An intuitive user interface and intelligent system control help to make the Vanquish Neo UHPLC system the most user-friendly low-flow UHPLC system ever built. The Thermo Scientific™ Vanquish™ User Interface provides:

- Easy system status monitoring through direct visualization of key system parameters
- Direct instrument control without requiring a PC during system preparation, maintenance and diagnostics
- Automated system procedures, which can be triggered remotely, include start-up, self-checks and leak tests for daily operational convenience
- Streamlined instrument troubleshooting with built-in diagnostic procedures and guided tutorials for increased uptime and reduced costs per injection

Guided maintenance procedures minimize instrument downtime.

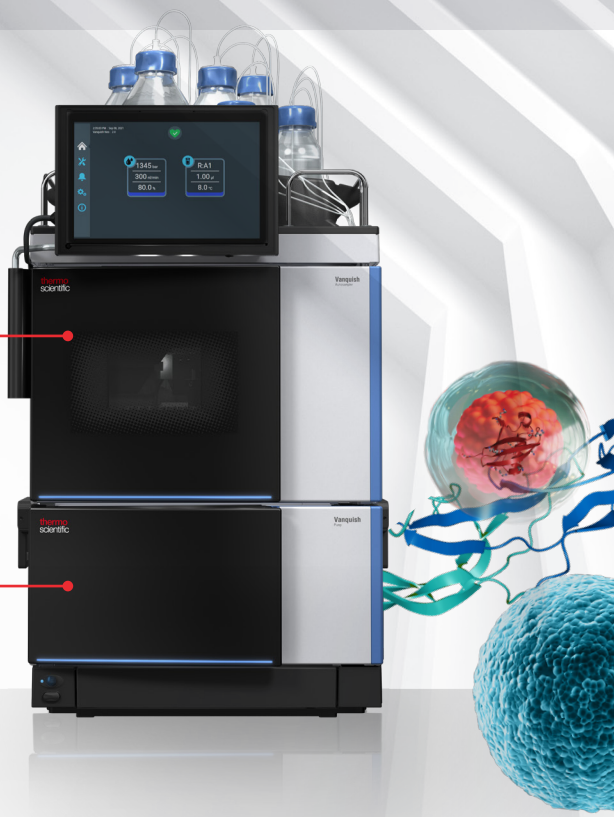
Walk-up and remote system status monitoring.



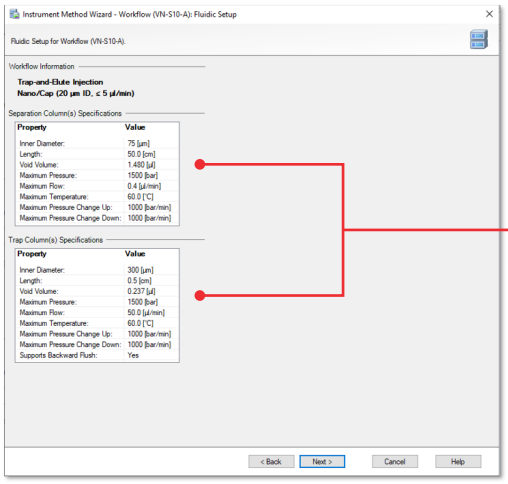
Built-in diagnostic procedures reduce time-consuming troubleshooting steps.

Intelligent operation

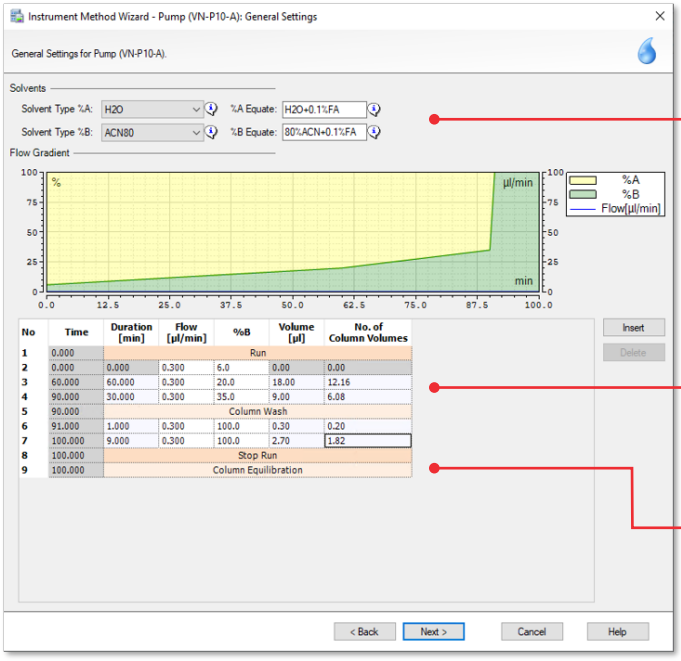
The Vanquish Neo UHPLC system features a new level of system intelligence with inter-module communication. Automated injection routines with optimized parameters for sample loading and fluidics washing deliver high chromatographic performance and reproducibility. The instrument method editor wizard helps ensure column compatibility with separation parameters.



The system interlink and single system driver provide an optimal user experience through intelligent, direct communication between modules, harmonizing all aspects of the chromatographic method execution.



Enhanced ease of use, method robustness, and standardization through active integration of consumable information such as column dimensions, pressure and flow limits to help ensure methods adhere to consumable specifications.



Factory pre-calibrated for common LC-MS mobile phases, plus guided calibration procedures for additional solvents.

Simplified gradient programming guided by time and flow permits the generation of standardized methods based on gradient or column volume.

Reduced user errors with active notifications which appear when operating out of the recommended range for method parameters such as flow rate and column washing/ equilibration times.


1
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11
12
ProFlow XR
1345 bar
300 nl/min
80.0 %
R:A1
1.00 µl
8.0 °C

Innovating for you

1 Vanquish User Interface
Provides smart system operation through system status monitoring, automatic start-up procedures and direct instrument control without requiring a PC connection for high operational convenience.

2 Ease-of-use
Straightforward fluidic design with labeled lines and pre-defined solvent bottle positions in the solvent rack.

3 SmartInject Technology
Reduces pressure drop for both direct and trap-and-elute injection, yielding high retention time precision and extending column lifetime.

4 High-precision metering device
Accurate injection volumes from 10 nL to 100 µL. Sample multiple-draw functionality extends the injection range up to 500 µL for sample analysis using the trap-and-elute workflow.

5 Workflow versatility
Choose between direct injection, tandem direct injection and trap-and-elute workflows. For trap-and-elute, switch between forward-flush or backward-flush modes without replumbing fluidics.

6 Multi-wash injection routines
Negligible system carryover through inner and outer injection needle and fluidics wash routines automatically executed in parallel to the sample analysis.

7 Vial bottom detection technology
Injection from limited sample volumes with near zero sample loss (up to 2.5 out of 3 µL).

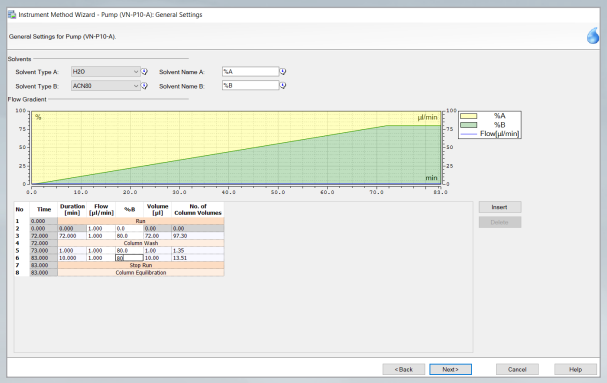
8 Standardized fluidic framework
Nano-, capillary- and micro-flow LC at up to 1500 bar. Leak-free nanoViper fittings minimize extra column dispersion and GDV, maximizing throughput and separation quality.

9 ProFlow XR technology
Active flow control across the nano-, capillary- and micro-flow ranges and factory multipoint flow calibration deliver industry-leading gradient accuracy, gradient precision and system-to-system reproducibility.

10 Fast sample loading and column equilibration
Accelerated sample loading and column equilibration with increased flow rate and pressure, reducing analysis time.

11 System interlink
Direct inter-module communication provides superior user experience and system intelligence.

12 Keep your lab tidy
A practical drawer allows the storage of consumables and tools for user convenience.



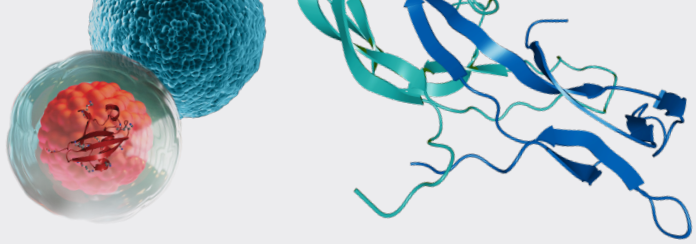
Intelligent operation

Smart guided method creation linked to consumable and fluidic parameters helps ensure robustness through optimal operation, fast sample loading and sufficient column washing and equilibration.

Optional column compartment

Temperature-controlled direct injection or heated trap-and-elute injections provide increased system versatility.

Brilliant separations



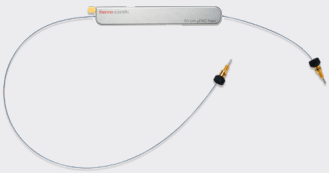
Built alongside the 1500 bar-capable Vanquish Neo UHPLC system, Thermo Scientific™ nano-, capillary- and micro-flow columns enable simple, tool-free setup and configuration. Thermo Scientific™ PepMap™ Neo columns range from 75 µm to 1 mm I.D., while Thermo Scientific™ µPAC™ Neo columns excel at nano and capillary flow rates with lengths ranging from 5.5 to 110 cm. PepMap Neo and µPAC Neo columns improve separation performance across the entire Vanquish Neo UHPLC system flow range, making them ideal for LC-MS applications.

EASY-Spray columns

Thermo Scientific EASY-Spray PepMap Neo columns help ensure robust nano- and capillary-flow LC-MS analysis. Available in 75 and 150 µm, the EASY-Spray integrated column and emitter design virtually eliminates dead volume and is temperature-controlled for maximum reliability and performance.

µPAC Neo columns

In addition to excellent chromatographic performance, µPAC Neo columns offer a unique combination of robustness and reproducibility across large sample sets.



Trap columns

Trap columns help accelerate sample loading and permit online sample concentration and desalting as well as helping to ensure protection of our entire low-flow column portfolio. The Thermo Scientific™ PepMap™ Neo trap is compatible with both PepMap and uPAC columns, rated to 1500 bar, and supports forward and backward flush modes. Trap columns are also available in 75 and 100 µm I.D.

Linear nano- and capillary-flow columns

Standalone columns for nano- and capillary-flow are designed with single nanoViper and double nanoViper trouble-free connectors for robust separation. Available in 75 and 150 µm and compatible with any MS system source design, they deliver excellent resolution, long column lifetime and low carryover.

Micro-flow columns

For outstanding peak shapes in micro-flow chromatography, 300 µm and 1 mm I.D. columns are available in a range of chemistries.

Emitters

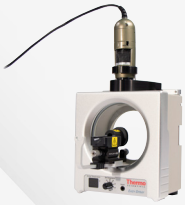
Nano and capillary emitters act as a column-independent sprayer, allowing the introduction of flow from nano and capillary columns without the troublesome handling of traditional emitters and connectors.

Seamless MS hyphenation

The Vanquish Neo UHPLC system is designed for a wide range of high-sensitivity LC-MS applications and flawless integration with industry-leading Thermo Scientific mass spectrometry portfolio and ESI sources.

- Unsurpassed resolution, mass accuracy and versatility with Thermo Scientific™ Orbitrap Exploris™ series, Thermo Scientific™ Orbitrap™ Tribrid™ series and Thermo Scientific™ Orbitrap™ Astral™ mass spectrometers
- Exceptional speed, robustness and sensitivity with Thermo Scientific™ Stellar™ and Thermo Scientific™ TSQ™ triple quadrupole mass spectrometers
- A broad range of electrospray ionization sources allow optimal MS integration for your separation
- System control with SII for Xcalibur or Chromeleon CDS

TSQ triple quadrupole mass spectrometers



Thermo Scientific™ EASY-Spray™ source

SII for Xcalibur

Chromeleon CDS

Stellar mass spectrometer

Thermo Scientific™ Nanospray Flex™ ion source

Orbitrap Exploris mass spectrometers

Thermo Scientific™ OptaMax™ NG ion source

Orbitrap Tribrid mass spectrometers

Orbitrap Astral mass spectrometer

Thermo Scientific LC portfolio overview

Analytical HPLC and UHPLC

Application-specific HPLC and UHPLC

Thermo Scientific™ Vanquish™ High-throughput LC Systems
Thermo Scientific™ Vanquish™ Inverse Gradient LC Systems
Thermo Scientific™ Vanquish™ Method Development HPLC and UHPLC Systems
Thermo Scientific™ Vanquish™ Online 2D-LC Systems
Thermo Scientific™ Vanquish™ Analytical Purification LC System
Thermo Scientific™ Transcend™ UHPLC Systems

Nano-, cap-, micro-flow UHPLC

Dependability

Thermo Scientific™ Vanquish™ Core HPLC Systems

- High-pressure binary, low-pressure quaternary solvent blending or isocratic flow delivery
- Workhorse instrument
- Seamless method transfer
- System intelligence for improved productivity

700 bar

Flexibility

Thermo Scientific™ Vanquish™ Flex UHPLC Systems

- High-pressure binary and low-pressure quaternary solvent blending
- Biocompatible
- Unparalleled flexibility and control

1000 bar

Performance

Thermo Scientific™ Vanquish™ Horizon UHPLC System

- High-pressure binary solvent blending
- Biocompatible
- Industry-leading specifications
- Unmatched detection sensitivity

1500 bar

Sensitivity

Thermo Scientific Vanquish Neo UHPLC System

- All-in-one nano-, capillary- and micro-flow LC systems
- Accelerating productivity with long-term, trouble-free operation
- Intelligent at-system or remote control method setup, diagnostics and troubleshooting

1500 bar

Learn more at **thermofisher.com/vanquishneo**

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