



Vanquish Neo UHPLC System
Beyond brilliant



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

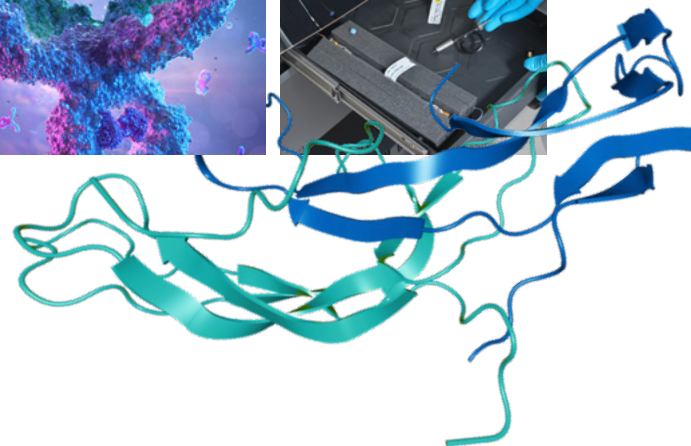
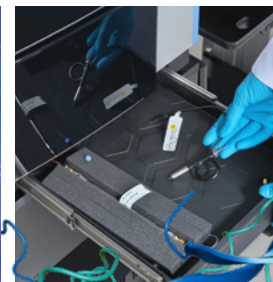
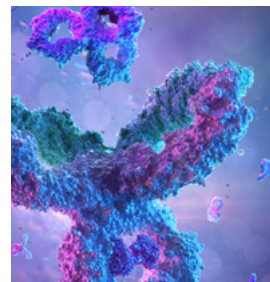
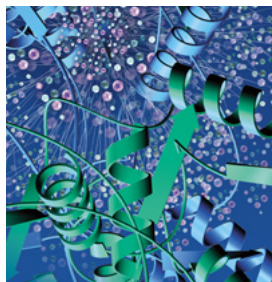
All-in-one nano-, capillary-, and micro-flow LC for high sensitivity LC-MS workflows.

Beyond innovation

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

Beyond possibilities

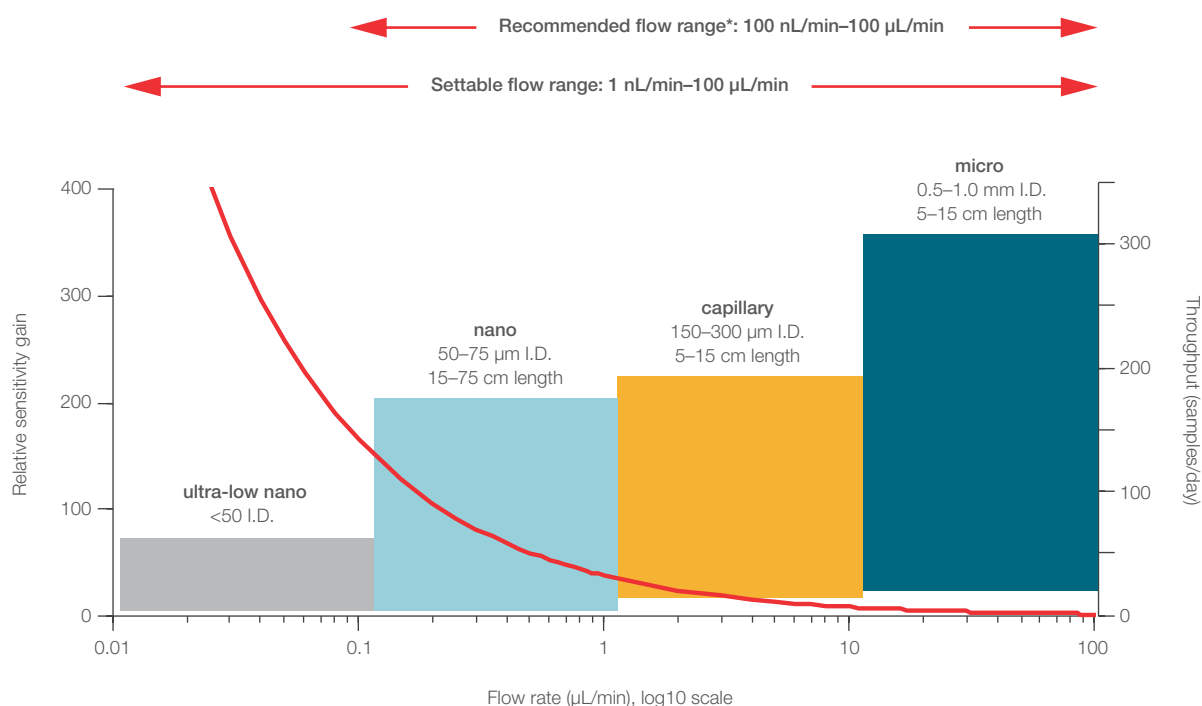
Enabling LC-MS experts and novice users to get high-quality results, every time.



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 $\mu\text{L}/\text{min}$ 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 ensures rapid gradient delivery for maximum sample throughput



The Vanquish Neo UHPLC system delivers flow rates from 1 nL/min to 100 $\mu\text{L}/\text{min}$ 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 $\mu\text{L}/\text{min}$ 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 ($\leq 0.2\%$ RSD or ≤ 0.1 SD).

Enabling precise temperature control

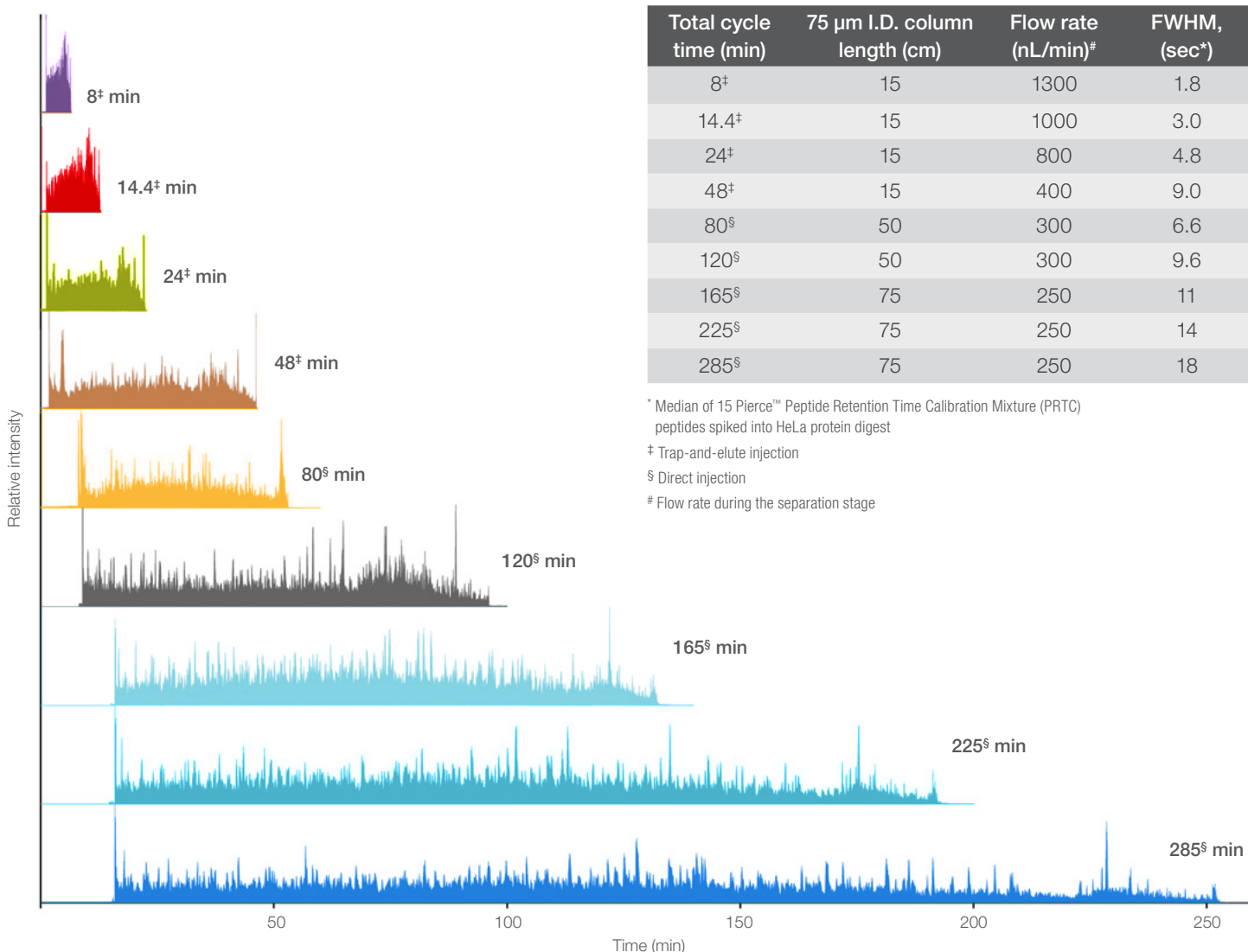
Ideal for micro-flow LC-MS applications, the optional Vanquish Neo column compartment provides stable temperature control for linear columns, coiled capillary columns, and trap columns.



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 μ m I.D. columns without changes to pump hardware
- Optimized configurations including direct and trap-and-elute injections improve productivity and ensure superior performance within a broad range of LC-MS workflows

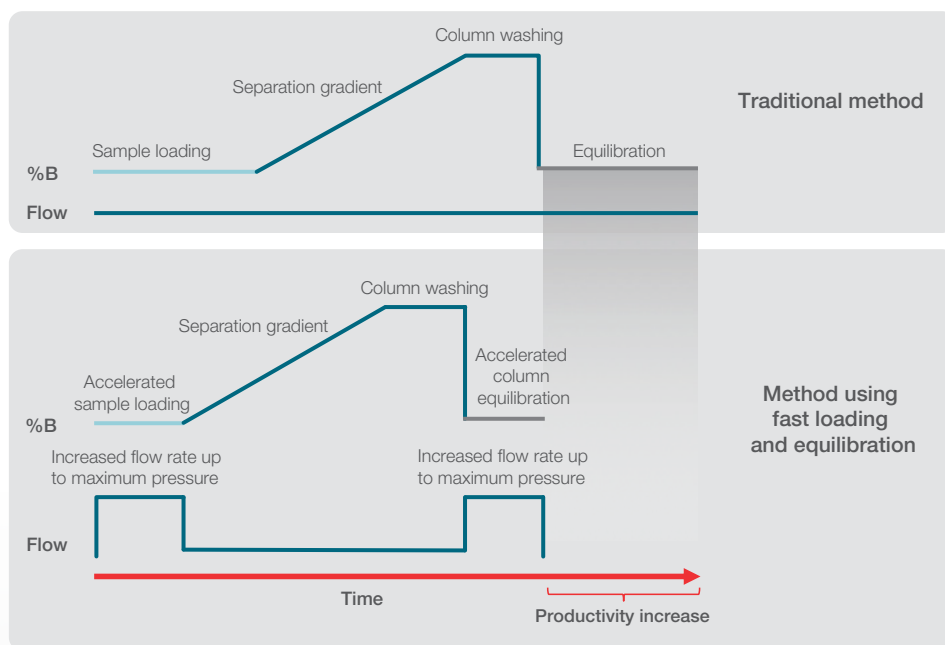


The Vanquish Neo UHPLC system supports a broad range of flow rates and gradient lengths without any changes to pump hardware. For all runs, 1 μ g of HeLa protein digest was separated on a Thermo Scientific™ EASY-Spray™ PepMap™ Neo column by a Vanquish Neo UHPLC system interfaced to a Thermo Scientific™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

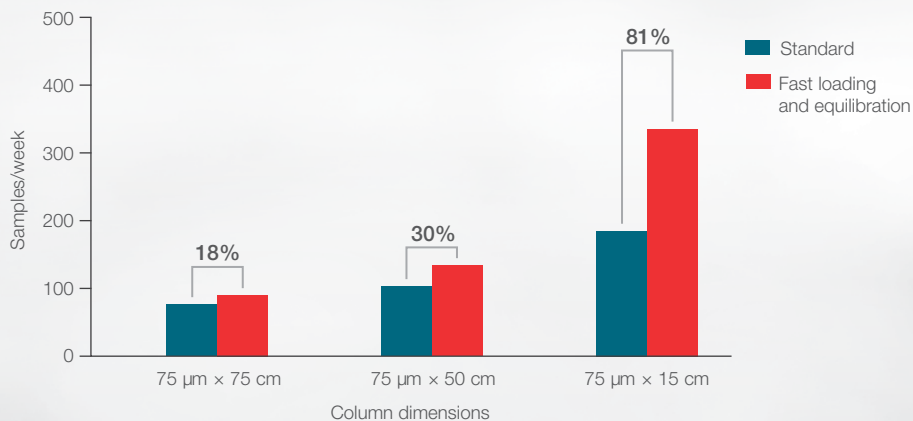
Accelerate productivity

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 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



Fast sample loading and equilibration increase system productivity.

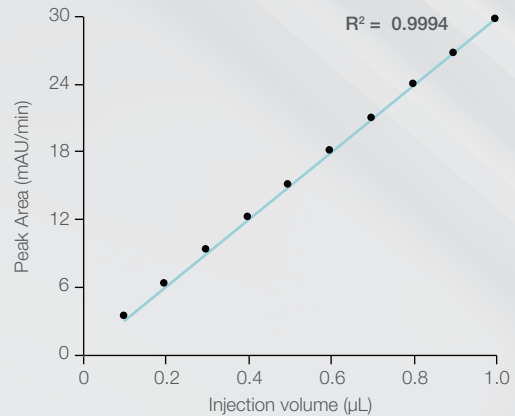


Comparison of sample throughput with and without fast sample loading and column equilibration. Estimated increase in sample throughput ranges from 18–81%, depending on column dimensions.

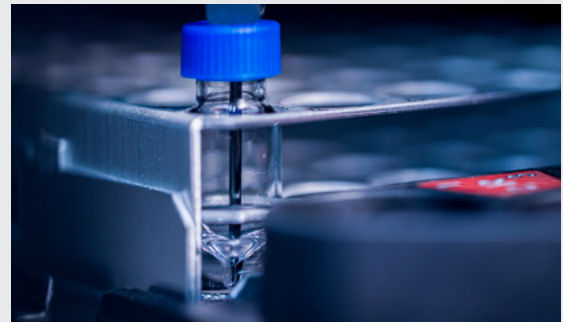
Maximize performance

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

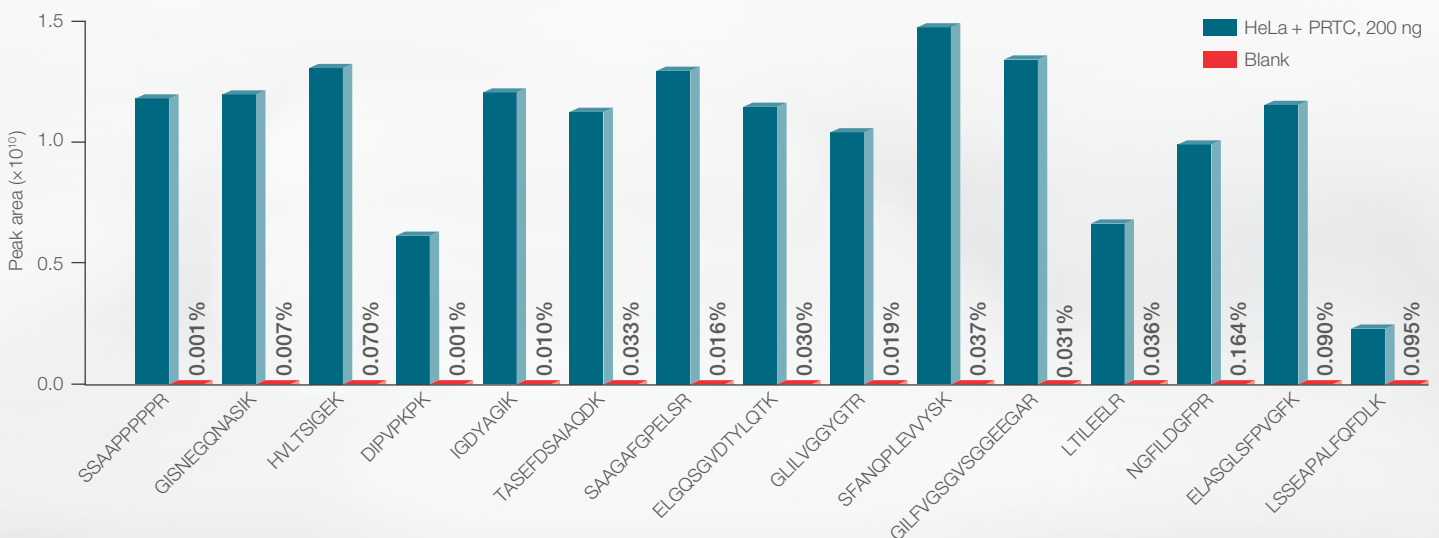
- Unique low-flow split-loop autosampler design limits sample dispersion, system carryover, and sample usage to maximize sensitivity and data quality
- Novel valve and fluidic designs ensure low gradient delay volume for increased system productivity
- Metering device delivers wide injection volume linearity, 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.

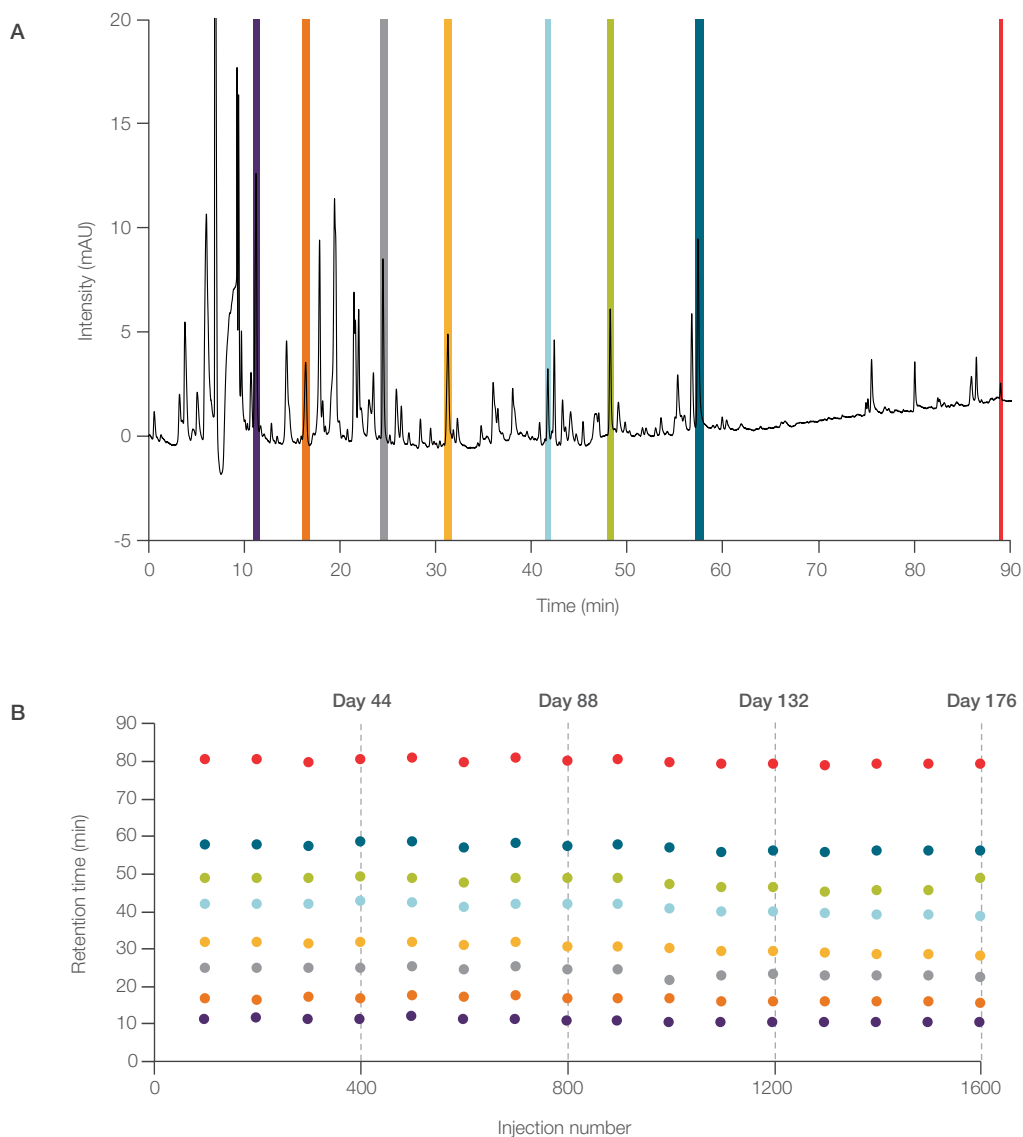


Carryover for 15 PRTC peptide standards spiked into HeLa protein digest. 200 ng was injected onto a 75 µm I.D. × 75 cm column followed by a blank injection using a Vanquish Neo UHPLC system coupled to an Orbitrap Exploris 480 operated in data dependent acquisition mode. Percent carryover is listed above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

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, lower solvent consumption and waste generation
- Thermo Scientific™ Viper™ and Thermo Scientific™ nanoViper™ fittings ensure near-zero dead volume, leak-free connections

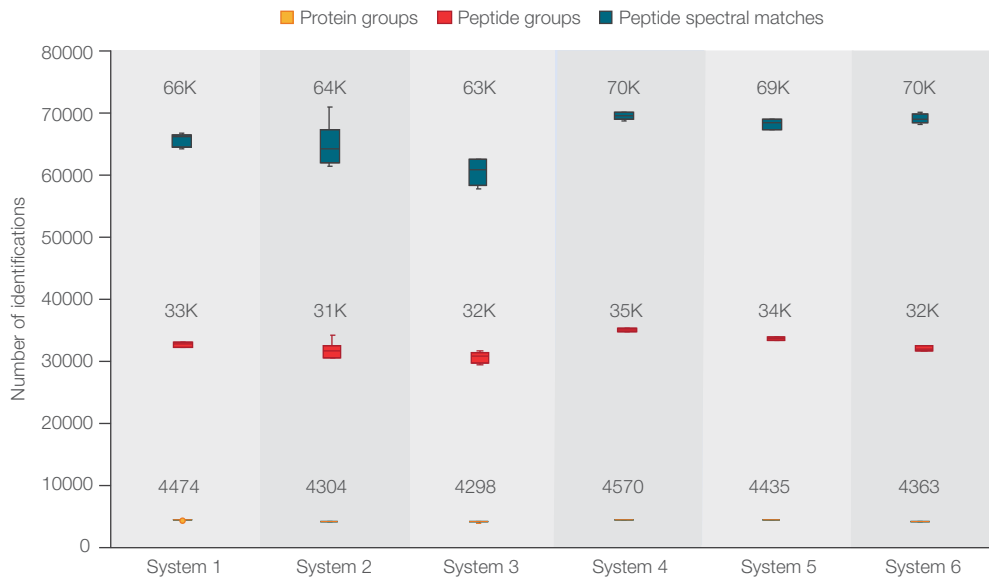


8 peptides were selected from a 90 minute gradient separation of 1 pmol BSA protein digest performed at 300 nL/min with the system configured in direct injection mode (A). Retention time stability was monitored for the selected peptides over a period of 176 days. In total, 1600 injections were performed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

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 1 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. 75 μm \times 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 were used.

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:

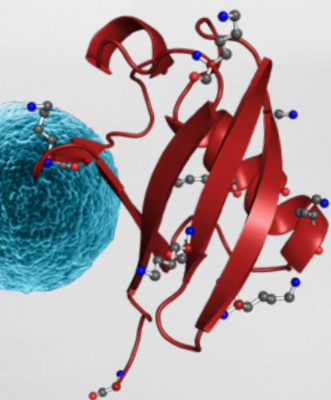
- Easy system status monitoring through direct visualization of key system parameters
- Direct instrument control without requiring a PC during system preparation, maintenance, and diagnostics
- Automated system procedures, which can be triggered remotely, include start-up, self-checks, and leak tests 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.



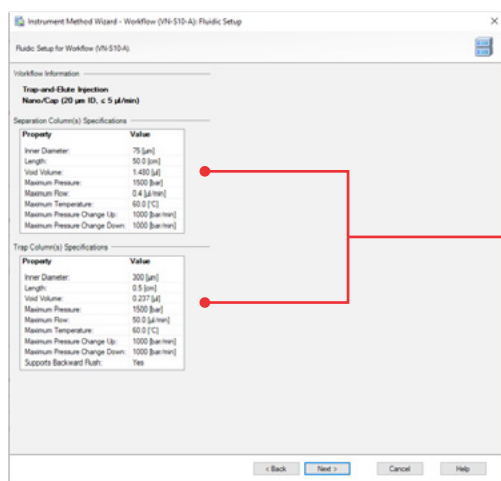
Built-in diagnostic procedures reduces time-consuming troubleshooting steps.



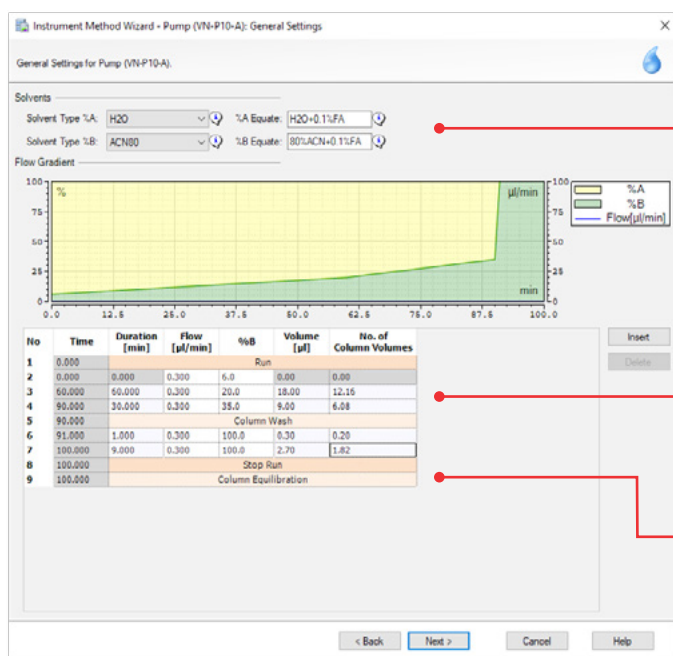
Intelligent operation

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 ensures 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.



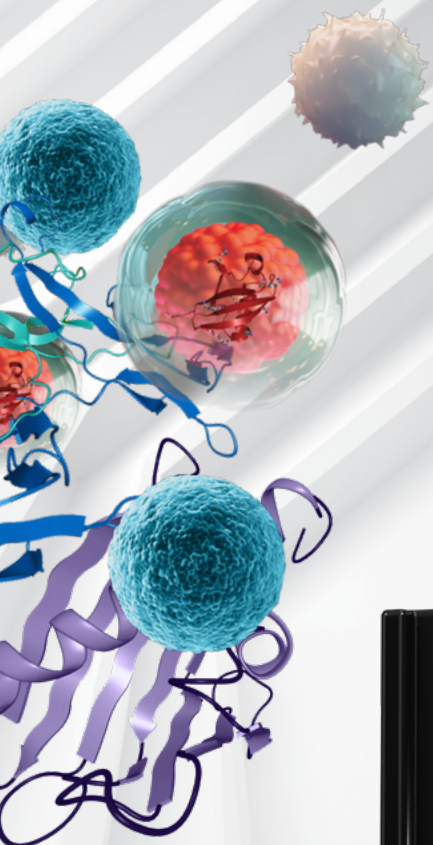
Enhanced ease of use, method robustness, and standardization through active integration of consumable information such as column dimensions, pressure, and flow limits to ensure methods adhere to consumable specifications.



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 out of the recommended range for method parameters such as flow rate and column washing/equilibration times.



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 μ L. Sample multiple-draw functionality extends the injection range up to 500 μ L for sample analysis using the trap-and-elute workflow.

5 Workflow versatility

Choose between 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 μ L).

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

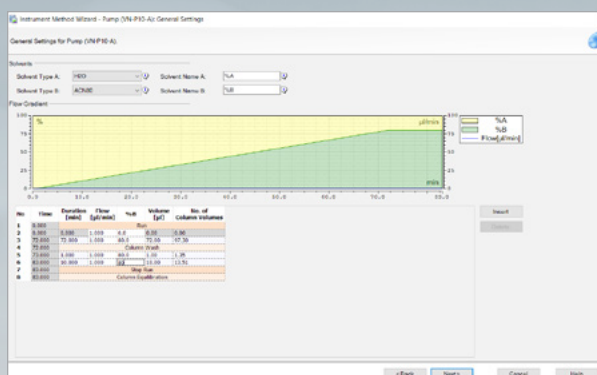
Accelerated sample loading and column equilibration with increased flow rate and pressure, reducing analysis time.

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

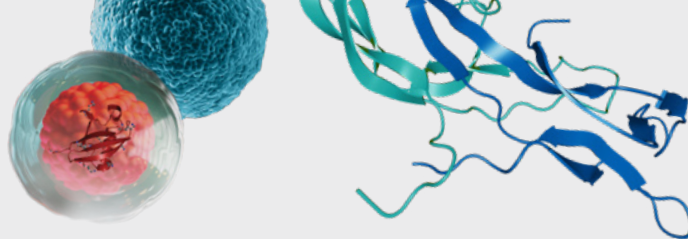
Smart guided method creation linked to consumable and fluidic parameters ensures robustness through optimal operation, fast sample loading, and sufficient column washing and equilibration.

Optional column compartment

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



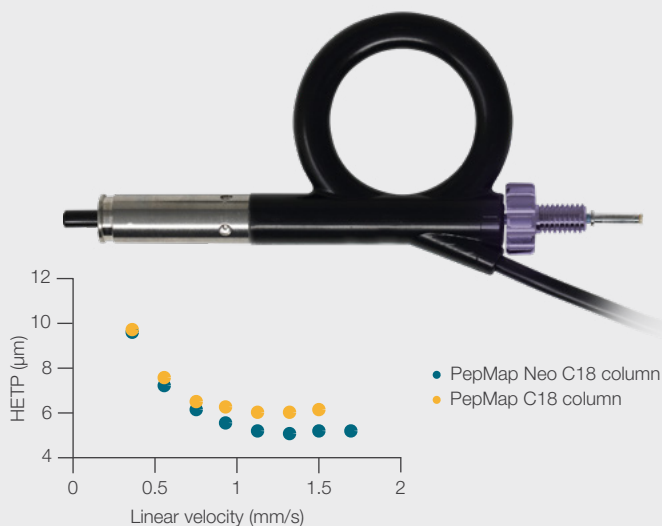
Brilliant separations



We offer robust and reproducible nano-, capillary-, and micro-flow columns for ultimate sensitivity and resolution. Built alongside the 1500 bar capable Vanquish Neo UHPLC system, Thermo Scientific™ PepMap™ Neo columns enable simple, tool-free set up and configuration. Thermo Scientific columns range from 75 μm to 1 mm I.D. for improved separation performance across the entire Vanquish Neo UHPLC system low-flow range; ideal for LC-MS applications.

EASY-Spray columns

Thermo Scientific™ EASY-Spray™ PepMap Neo columns ensure robust nano- and capillary-flow LC-MS analysis. The EASY-Spray integrated column and emitter design virtually eliminates dead volume and is temperature-controlled for maximum reliability and performance.



PepMap Neo C18 columns (teal) outperform Thermo Scientific™ PepMap™ C18 (orange) columns of the same format—50 cm \times 75 μm I.D., 2 μm particle diameter

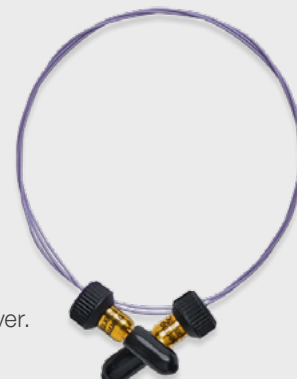
Trap columns

Trap columns help accelerate sample loading and permit on-line sample concentration and desalting as well as ensuring protection of our entire low-flow column portfolio. The Thermo Scientific™ PepMap™ Neo trap is 1500 bar pressure compatible.



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. Compatible with any MS system source design, they deliver excellent resolution, long column lifetime, and low carry-over.



Micro-flow columns

For outstanding peak shapes in micro-flow chromatography, 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

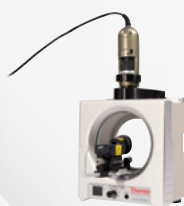
The Vanquish Neo UHPLC system is designed for a wide range of high-sensitivity LC-MS applications and flawless integration with industry-leading Thermo Scientific mass spectrometry portfolio and ESI sources.

- Unsurpassed resolution, mass accuracy, and versatility with Thermo Scientific™ Orbitrap Exploris™ series and Orbitrap Tribrid™ series mass spectrometers

- Exceptional speed, robustness, and sensitivity with Thermo Scientific™ TSQ™ triple quadrupole mass spectrometers
- A broad range of electrospray ionization sources allow optimal MS integration for your separation
- System control with Thermo Scientific Standard Instrument Integration (SII) for Xcalibur™ or Thermo Scientific™ Chromeleon™ CDS software



Thermo Scientific™ Orbitrap Exploris™ mass spectrometers



Thermo Scientific™ EASY-Spray™ source



SII for Xcalibur



Chromeleon™ CDS



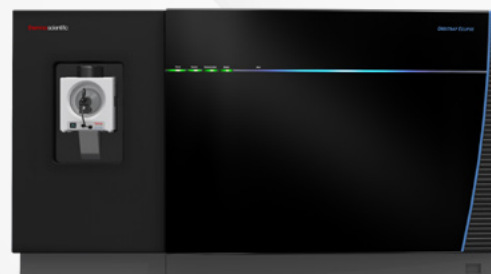
Thermo Scientific™ Nanospray Flex™ ion source



Thermo Scientific™ OptaMax™ NG ion source



Thermo Scientific™ TSQ™ triple quadrupole mass spectrometers



Thermo Scientific™ Orbitrap Tribrid™ mass spectrometers

Thermo Scientific LC portfolio overview

Analytical HPLC and UHPLC

Application-specific HPLC and UHPLC

Thermo Scientific™ Vanquish™ Duo LC Systems
 Thermo Scientific™ Vanquish™ Method Development LC Systems
 Thermo Scientific™ Vanquish™ Online 2D-LC Systems
 Thermo Scientific™ Transcend™ LX and TLX LC 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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