



Vanquish HPLC and UHPLC Systems

LC that takes your
productivity to new heights

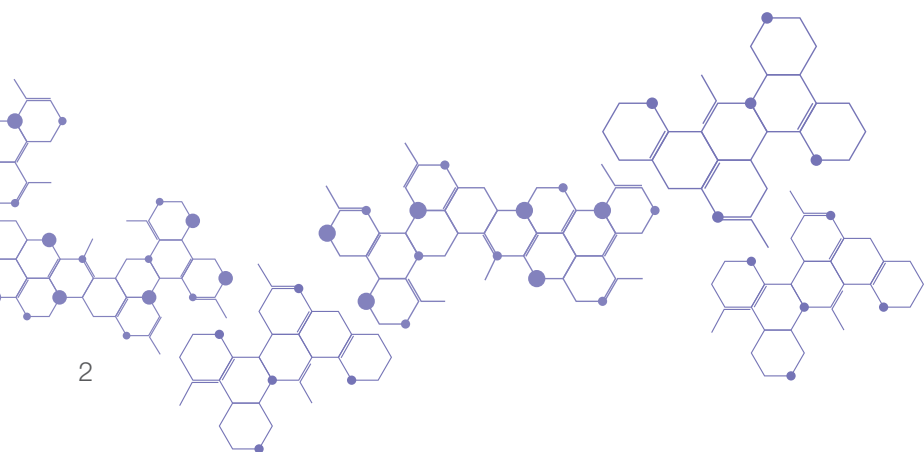
Get more from your liquid chromatography

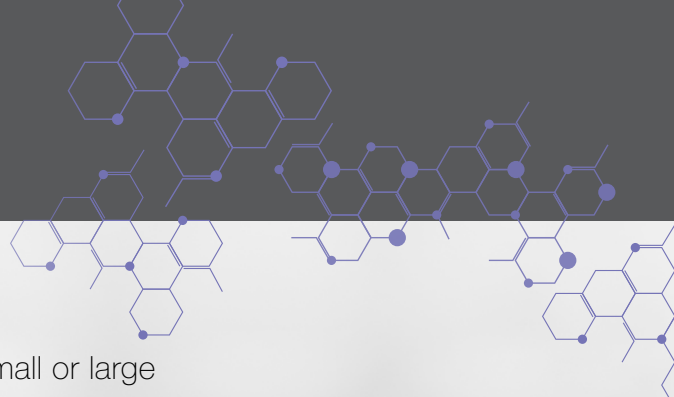
No trade-offs in performance, robustness or ease of use

Today's scientists need to solve challenges to produce life-saving medicines and to improve the quality of our food and environment. This work deserves the best analytical tools available; empowering you to achieve your next scientific breakthrough, measure the previously unmeasurable, and deliver dependable quality results.

Designed with innovative technology and attention to fine detail, Thermo Scientific™ Vanquish™ HPLC and UHPLC systems are the most advanced LC instruments available. The Vanquish systems improve performance and repeatability with no trade-offs in quality, robustness, or ease-of-use. Regardless of which Vanquish HPLC or UHPLC system is used, chromatographers have every tool they need to solve the toughest analytical challenges with confidence.

- **Deliver results without compromise**—
Unsurpassed retention time and peak area precision
- **Easier method development and routine analysis**—Dedicated tools for fast method development and validation with exceptional instrument robustness to maximize uptime
- **Improve productivity**—Better throughput, improved sample characterization, and faster return on investment
- **Detect the lowest analyte quantities**—
Higher detector sensitivity and lower baseline noise
- **Seamlessly integrate mass spectrometry**—
Dedicated kits and software solutions provide exceptional LC-MS performance
- **Maximize your results**—Easy-to-use, control, and process data with Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS)





Run more samples, unattended

Designed for any application—whether HPLC or UHPLC, small or large molecules, simple or complex mixtures—the Vanquish platform was designed to handle it all. This innovative, simple-to-operate, and easy-to-maintain platform delivers confident separations and pushes chromatographic boundaries. Regardless of the configuration you choose, you get a highly integrated solution with optimized fluidics, providing unsurpassed retention time and peak area precision.



Thermo Scientific™ Vanquish™ Core HPLC system

Absolute dependability to enable worry-free applications



Thermo Scientific™ Vanquish™ Flex UHPLC systems

Complete flexibility for method development or fast and reliable UHPLC



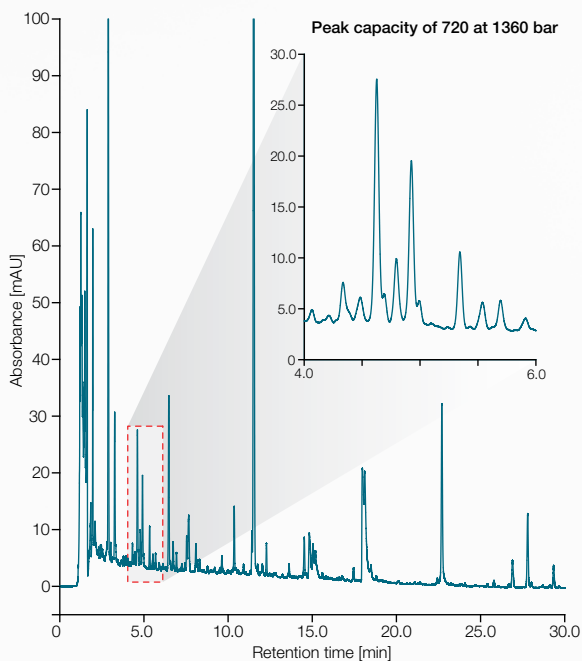
Thermo Scientific™ Vanquish™ Horizon UHPLC system

Unrivalled performance and throughput for applications requiring high-end UHPLC

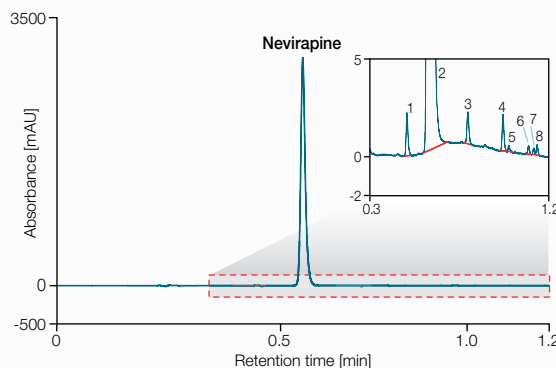
Deliver results without compromise

Vanquish Horizon UHPLC system

The Vanquish Horizon UHPLC system is an integrated, fully biocompatible, state-of-the-art binary UHPLC system with ultra-low gradient delay volume, designed to provide unrivaled performance for high resolution and high-throughput LC and LC-MS applications.



Ultra-high peak capacity for a complex herbal extract analysis.

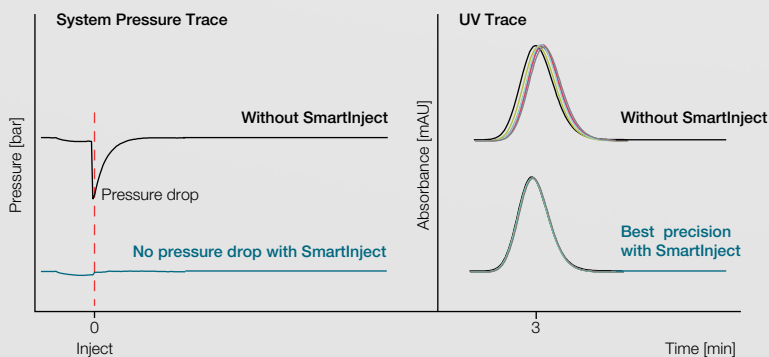


Impurity profiling of nevirapine (0.66 mg/mL) with UHPLC gradient and zoom into the baseline to show related impurities.

Why SmartInject Technology?

During injections, the sample loop at atmospheric pressure is placed in line with the high-pressure flow path, typically resulting in a pressure drop. With regular UHPLC systems, this adversely affects retention time precision and column lifetime.

Thermo Scientific™ SmartInject Technology automatically eliminates the pressure drop, improving data confidence and reduced cost of ownership.

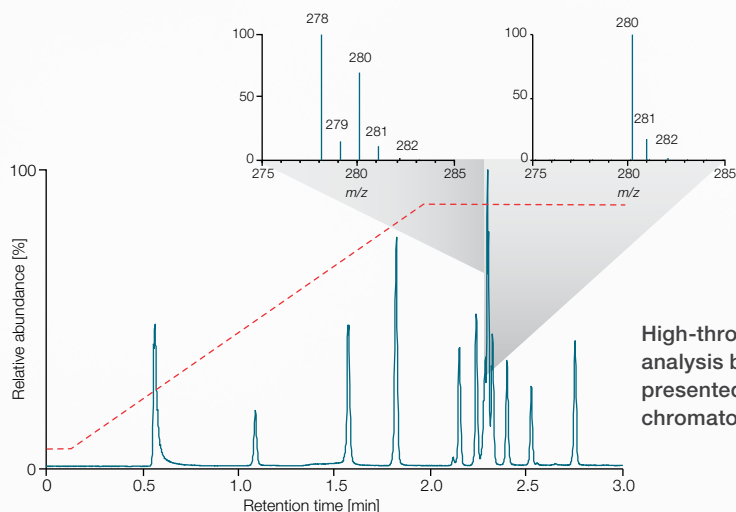


Significant reduction of pressure drop after sample injection using SmartInject Technology resulting in improved retention time reproducibility (6 replicates) and enhanced column lifetime.

Easier method development and routine analysis

Vanquish Flex UHPLC systems

The Vanquish Flex systems offer binary and quaternary solvent blending. Binary solvent blending results in low gradient delay volumes ideal for routine UHPLC and LC-MS applications. Quaternary solvent blending allows multicomponent gradient formation for flexible UHPLC method development.



Vanquish Core HPLC system

Vanquish Core HPLC systems offer highly dependable HPLC analysis for binary, quaternary and isocratic solvent blending. A new level of user experience, the highest system productive time, and its ease to adopt within any given laboratory infrastructure make it ideal for all traditional HPLC analyses.



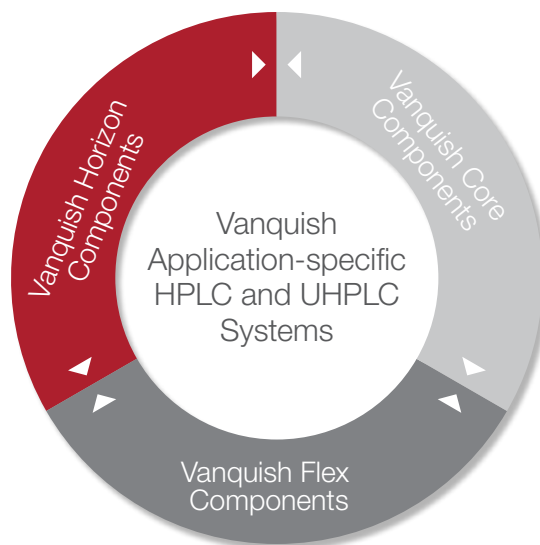
Test sites of a Vanquish Core HPLC system round robin test using eight different instruments with individual samples, users, and columns. Each analysis passed the specified SST criteria highlighting the reliability of the instrument and the ease of use for each user resulting in a successful SST.



Customize your LC to your needs

While Vanquish HPLC and UHPLC systems are designed to address a broad range of analytical challenges, some applications require even more specialized solutions.

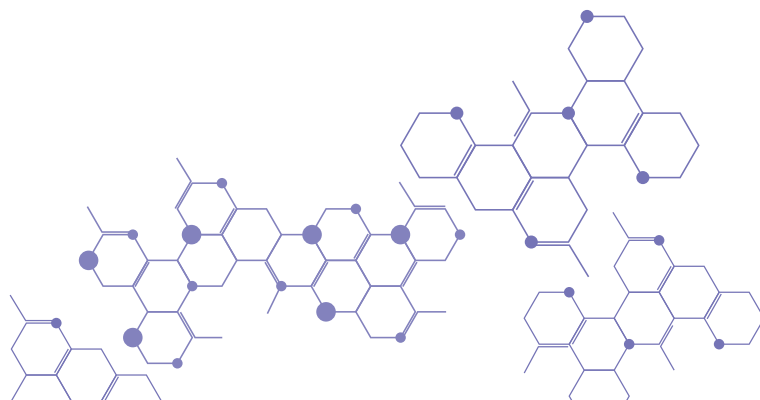
Vanquish application-specific systems leverage custom configurations of standard Vanquish components to address your most demanding applications. With this modular flexibility of the Vanquish platform, we offer systems tailored to boosting your productivity, increasing confidence in your analysis, and accelerating your HPLC and UHPLC method development.



Unique dual technology

The Vanquish platform contains two unique dual modules, which are utilized for application-specific systems. The Vanquish dual pumps merge two individual, low pressure mixing pumps in one housing enabling separate eluents and gradients for each pump while saving capital investment and bench space. The Vanquish dual split samplers possess two independently controlled injection units including separate injection valves and injection needles.

These two unique dual components are utilized across the Vanquish application-specific system portfolio including the Thermo Scientific™ Vanquish™ High-throughput LC systems, Thermo Scientific™ Vanquish™ Inverse Gradient LC systems, and Thermo Scientific™ Vanquish™ Online 2D-LC systems.



Boost your productivity

Thermo Scientific Vanquish High-throughput LC systems

Increase your productivity with two flow paths for higher throughput or deeper sample characterization.



Improve your quantification

Thermo Scientific Vanquish Inverse Gradient LC systems

Achieve a uniform response for all detectable analytes with charged aerosol detection (CAD) by utilizing a second pump to deliver an inverse gradient.



Enhance your confidence

Thermo Scientific Vanquish Online 2D-LC systems

Enhance your confidence for the separation of complex samples and difficult-to-resolve analytes by utilizing a combination of two separation chemistries.



Purify your samples

Thermo Scientific™ Vanquish™ Analytical Purification LC systems

Match the separation power of Vanquish LC systems with compelling fractionation for high-purity and high-yield compound collection.

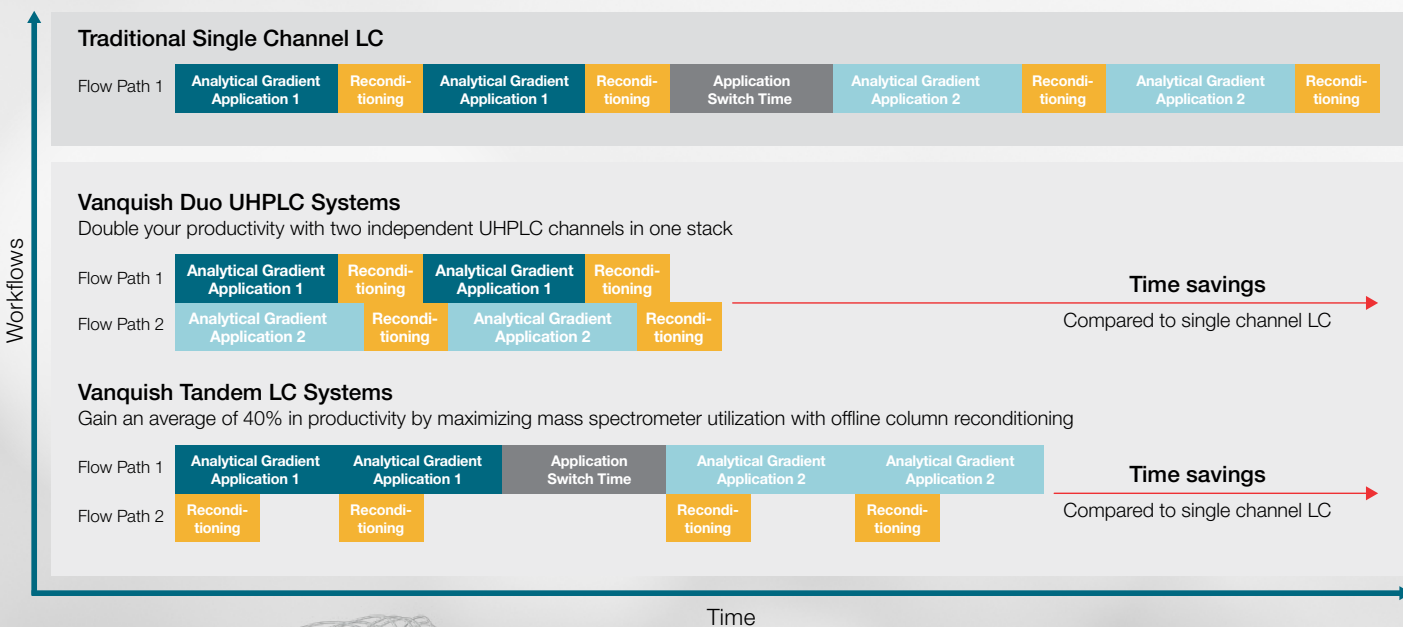
Accelerate your development

Thermo Scientific™ Vanquish™ Method Development HPLC and UHPLC systems

Accelerate your method development with automated column and solvent switching hardware and third party method development software compatibility.

Boost your productivity

The Vanquish High-throughput LC systems improve productivity and sample knowledge to deliver a faster return on investment. These systems expand the benefits of our award-winning Vanquish platform with additional features designed to enhance your throughput.



Vanquish Duo UHPLC systems

Double your throughput, deepen your sample knowledge, and efficiently utilize your bench space with the Vanquish Duo UHPLC systems. Two completely independent flow paths for maximum productivity.

Vanquish Tandem LC systems

Increase your lab's throughput by 40% with the Vanquish Tandem LC systems. Maximize the utilization of your optical detector or mass spectrometer.

Enhance your confidence

Complex samples with co-eluting peaks or interfering matrixes are not always successfully separated with conventional UHPLC utilizing a single column chemistry. In these cases, the analysis is improved by employing two-dimensional liquid chromatography to resolve co-eluting peaks and gain confidence in your separation.

Four different Vanquish 2D-LC systems can be configured from Vanquish Core, Vanquish Flex and Vanquish Horizon modules/components targeting different two-dimensional LC workflows:

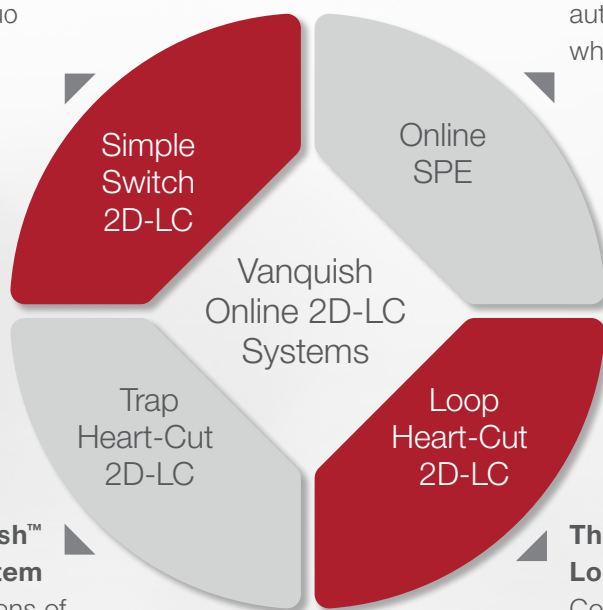
Vanquish Online 2D-LC systems

Thermo Scientific™ Vanquish™ Simple Switch™ 2D-LC system

Achieve utmost application flexibility through seamless switching between a Vanquish Trap Heart-Cut 2D-LC instrument and a Vanquish Duo UHPLC system.

Thermo Scientific™ Vanquish™ Online SPE HPLC and UHPLC system

Ensure analyte pre-concentration and sample clean-up in an automated repeatable workflow while saving solvent and time.

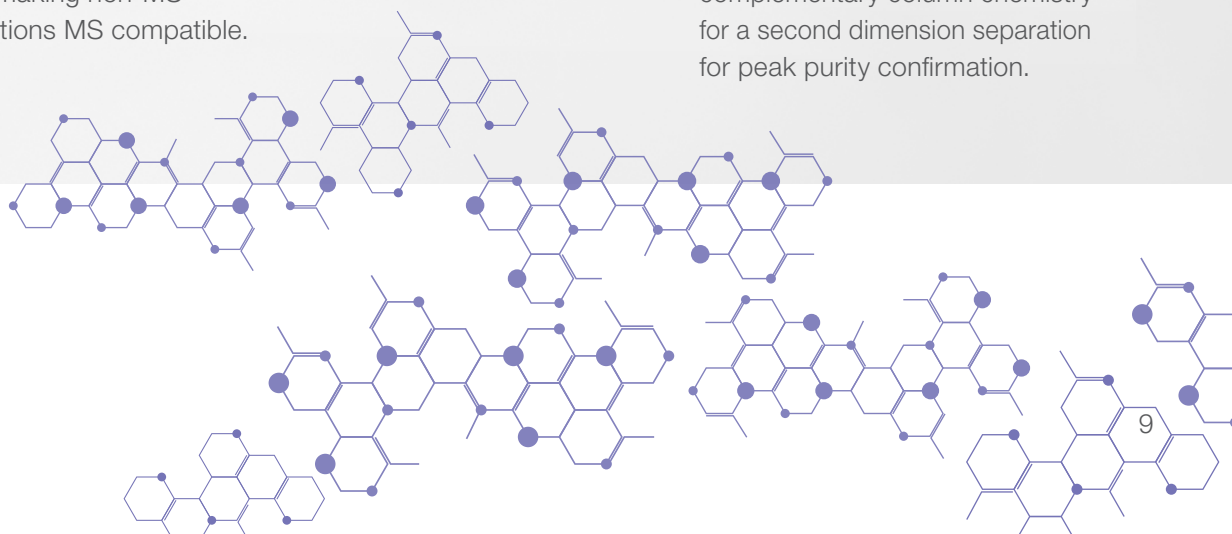


Thermo Scientific™ Vanquish™ Trap Heart-Cut 2D-LC system

Transfer one or multiple fractions of the first dimension analytical column to a trap column before submitting to the second dimension for improved detection flexibility such as, making non-MS compatible separations MS compatible.

Thermo Scientific™ Vanquish™ Loop Heart-Cut 2D-LC system

Collect one or multiple fractions of the first dimension separation in a sample loop and transfer the cut-out fraction(s) to a complementary column chemistry for a second dimension separation for peak purity confirmation.



Accelerate your development

Traditional method development requires weeks—months for skilled chromatographers to optimize a broad range of separation parameters. The Vanquish Method Development HPLC and UHPLC systems enable automated method development workflows including method scouting, optimization, sample profiling,

robustness testing, and validation in a fraction of the time. A variety of hardware and software solutions means that the system can be customized to address your most demanding method development tasks from chiral to large biomolecule separations.

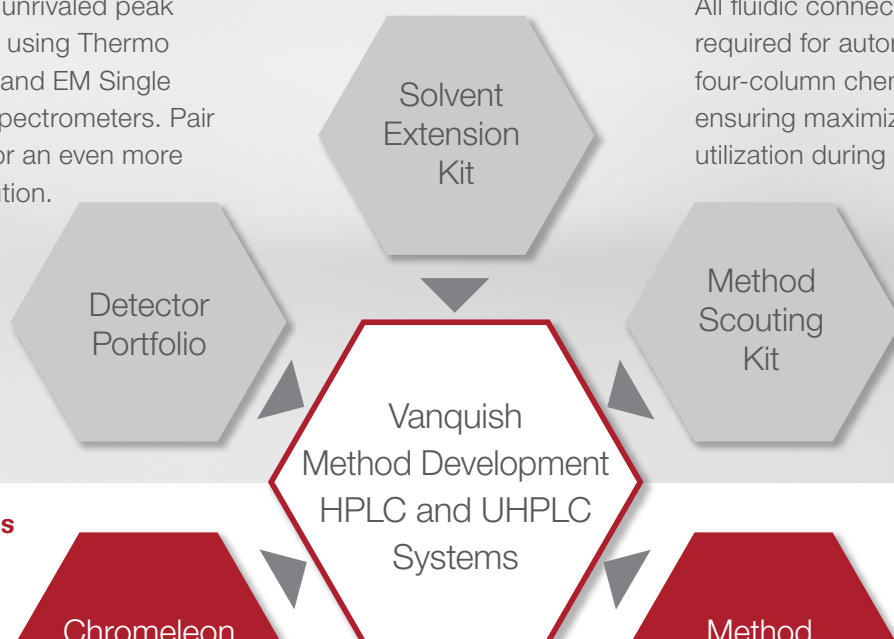
Vanquish Method Development HPLC and UHPLC systems

Hardware solutions

Enhanced confidence in method development with universal analyte detection using a Charged Aerosol Detector (CAD) and unrivaled peak tracking capabilities using Thermo Scientific™ ISQ™ EC and EM Single Quadrupole mass spectrometers. Pair multiple detectors for an even more comprehensive solution.

Accelerate method development through the use of up to nine additional solvents with automated column switching and purging.

All fluidic connections and capillaries required for automated scouting of four-column chemistries included, ensuring maximized instrument utilization during method development.



Software solutions

Intuitive and secure control of all stages of method development within compliant laboratory settings using Chromeleon CDS. Access the AppsLab Library of Analytical Applications for full, predefined eWorkflows™ procedures from sequence setup to result reporting.

Perform unattended method development in a fraction of the time with Vanquish-compatible third party method development software including ChromSwordAuto™ and Fusion QbD®.

ChromSword AutoRobust™ and Fusion QbD automate design and execution of robustness testing while Chromeleon Extension Pack ICH templates provide full workflows for method validation.

Improve your quantification

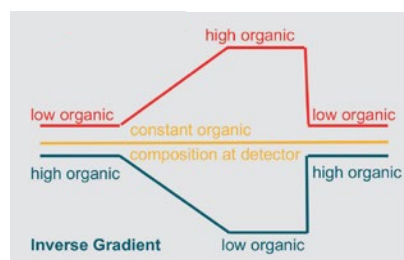


Improve your lab's quantification capabilities with Thermo Scientific Vanquish Inverse Gradient LC systems, employing the unique and universal Charged Aerosol Detection, to consistently quantify all non-volatile and semi-volatile compounds even when no reference standard is available.

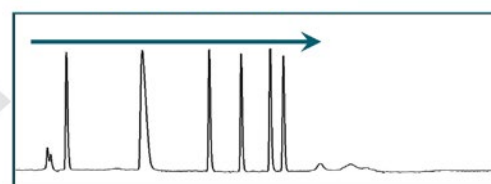
By utilizing a second pump to deliver an inverse gradient, the detector offers:

- Uniform response with CAD under gradient elution conditions
- Simplifying method setup with automatic Inverse Gradient calculation considering all system volumes
- Reliable standard-free quantification of knowns and unknowns

Analytical gradient



Inverse gradient compensation



Purify your samples

The isolation of a single compound from a complex mixture can be a major challenge for scientists tasked with in-depth sample characterization. The demands for isolation followed by further investigation can be multifaceted, based on the key area of focus of the drug development process.

The Vanquish Analytical Purification LC Systems support a broad range of applications for both upstream and downstream processes. They match the separation power of the LC systems with compelling fractionation for high-purity and high-yield compound collection. Built with Thermo Scientific Vanquish HPLC and UHPLC system components, they deliver unrivaled performance, robustness, and user-friendliness.

Purify by fractionation to:

- Identify and characterize new target analytes
- Improve production process by impurity profiling
- Isolate reference material
- Enrich compound of interest by pooling



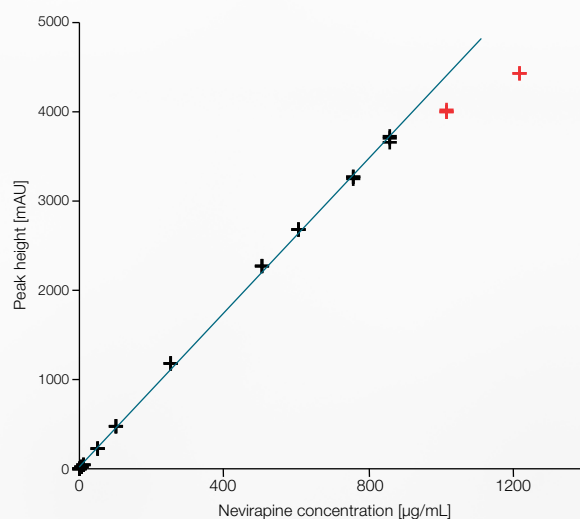
Detect the lowest sample quantities

Choosing the right detection technology is key to revealing all the components of interest in your sample. The Vanquish HPLC and UHPLC platforms offers a wide range of detection capabilities that can be easily integrated and combined to fit your methods.



Industry-leading diode array detection

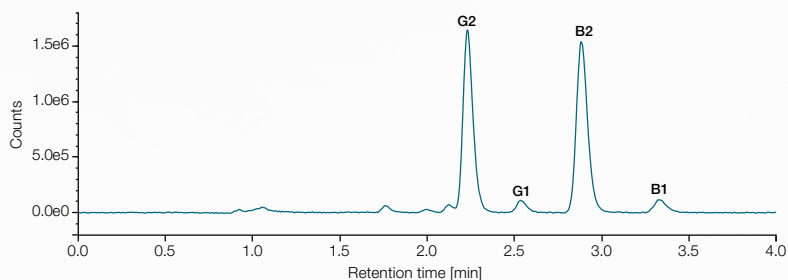
The Thermo Scientific Vanquish Diode Array Detector HL, with the Thermo Scientific™ LightPipe™ detection technology, delivers supreme analyte sensitivity through low baseline noise and longer effective light path by total internal reflection. The Thermo Scientific Vanquish Diode Array Detector FG offers cutting edge detector linearity, as well as a smooth and robust LC-MS integration. Based on diode array detection technology, the Multiple Wavelength Detector offers a cost-effective solution for simultaneously acquiring up to eight UV-Vis wavelength channels.



Concentration vs. peak height plot of nevirapine with data points that were considered for calibration (black) and data points that were eliminated from calibration due to curve decline (red). Linear calibration with permitted offset and no weighting.

Powerful fluorescence detection

Fluorescence detection enables high sensitivity detection of fluorescent compounds with a long-life lamp technology.



FLD chromatogram of the four aflatoxins: G2, G1, B2 and B1 at a concentration of 0.9 µg/kg for G2 and B2 and 2.9 µg/kg for G1 and B1.

Routine analysis

Refractive Index detection (RID) is a cost-effective solution recommended for the routine analysis of non-UV absorbing compounds.

Cost-effective, reliable UV-Vis

UV-Vis detection with excellent sensitivity and linearity is available to streamline in targeted compound analysis.

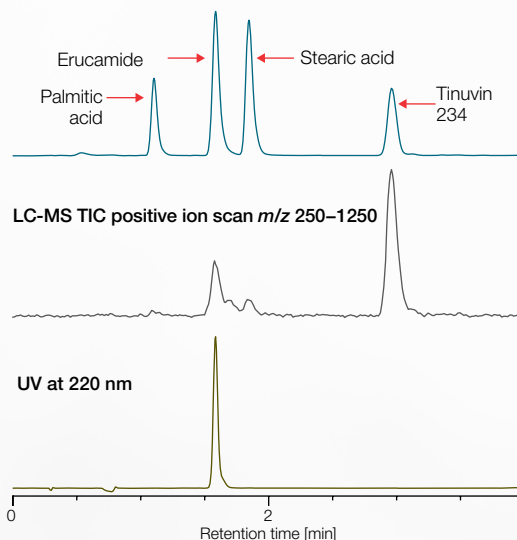




Uniquely universal charged aerosol detection

The Thermo Scientific™ Vanquish™ Charged Aerosol Detector is powerful and universal, able to detect virtually any large and small molecule that lacks a chromophore, or that poorly ionizes, with sub-nanogram-level sensitivity and near-uniform response. The flexibility and performance of charged aerosol detection is ideal for analytical R&D, while its simplicity and reproducibility benefit manufacturing QA/QC applications.

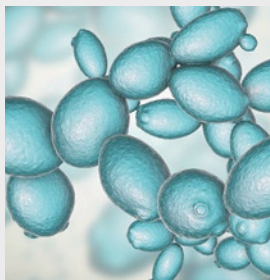
Charged Aerosol Detection



Unlike mass spectrometry (A) and UV (B), the CAD can measure all analytes in a sample. Mass spectrometry (MS) requires the analyte to form gas phase ions while response by a UV detector depends upon the nature of the chromophore.

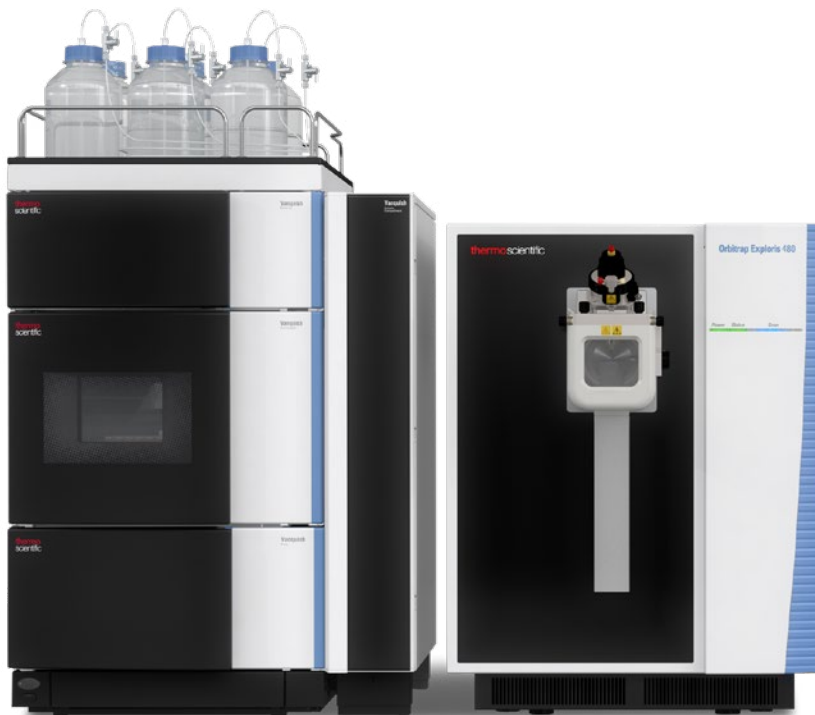
Single quadrupole mass detection

Mass spectrometry gives access to valuable data no other technology can deliver. The easy to use ISQ EM single quadrupole mass spectrometer or the ISQ EC single quadrupole mass spectrometer integrates with LC systems for reliable, robust, and easy LC-MS routine analysis with an extended mass range for greater flexibility. Integrated software allows both novices and experts to quickly master MS to gain more insights from every sample.

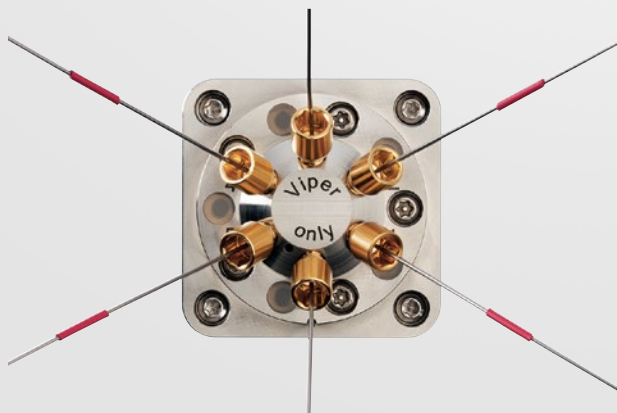


Seamlessly integrate MS

The Vanquish platform combines seamlessly with Thermo Scientific™ mass spectrometers, providing an extra level of information, confidence and productivity. Mass spectrometry provides sensitivity and selectivity for your analyses, giving you further insight into your samples and ability to resolve difficult separations, including co-eluting peaks, using differing mass-to-charge (m/z) ratios.



Thermo Scientific Vanquish system with the Thermo Scientific™ Orbitrap Exploris™ 480 mass spectrometer.



Get better LC connections

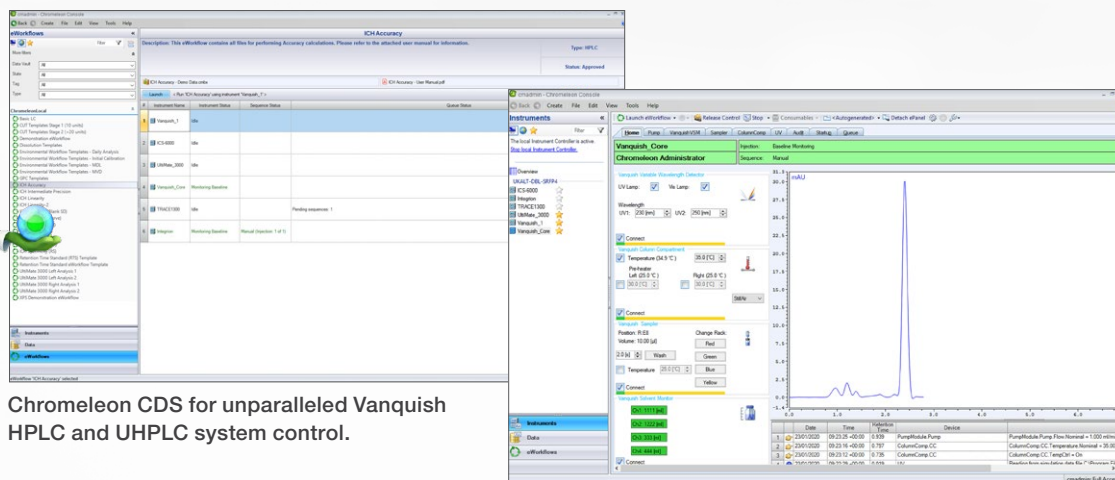
Thermo Scientific™ Viper™ Fingertight Fittings revolutionize UHPLC connections. Viper fittings pave the way for easy setup of virtually dead-volume-free chromatography, even for your advanced column configurations. Now you can enjoy tool-free system fluidics setup and other connections.

Maximize your results



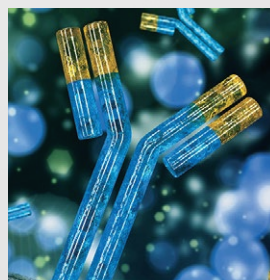
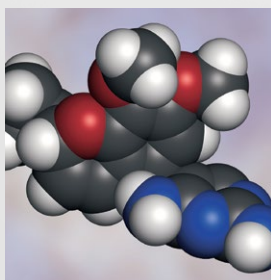
One CDS to do it all

Benefit from the industry-leading, easy-to-use and compliant Chromeleon CDS with eWorkflow procedures for error-free sequence and method setup, dedicated ePanels for direct instrument control, walk-up Open Access software, and smart tools to streamline data processing and reporting. Chromeleon CDS delivers advanced system communication with single-point intelligent control and functionality. The control of selected Vanquish LC systems in Waters™ Empower™ and Agilent™ OpenLab™ CDS software is enabled by dedicated software plugins.



Optimize your separations with Thermo Scientific columns

The Vanquish HPLC and UHPLC systems are designed around the column, the core to every LC separation. Our family of Thermo Scientific™ Vanquish™ LC columns partner with the Vanquish platform to take advantage of its extended pressure capabilities and robustness, allowing you to optimize your separations faster and more easily. In addition, all Vanquish LC valves are biocompatible, have a long lifespan and are low maintenance, meeting the performance needs to make LC run robustly and routinely.



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 LC 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/liquidchromatography

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