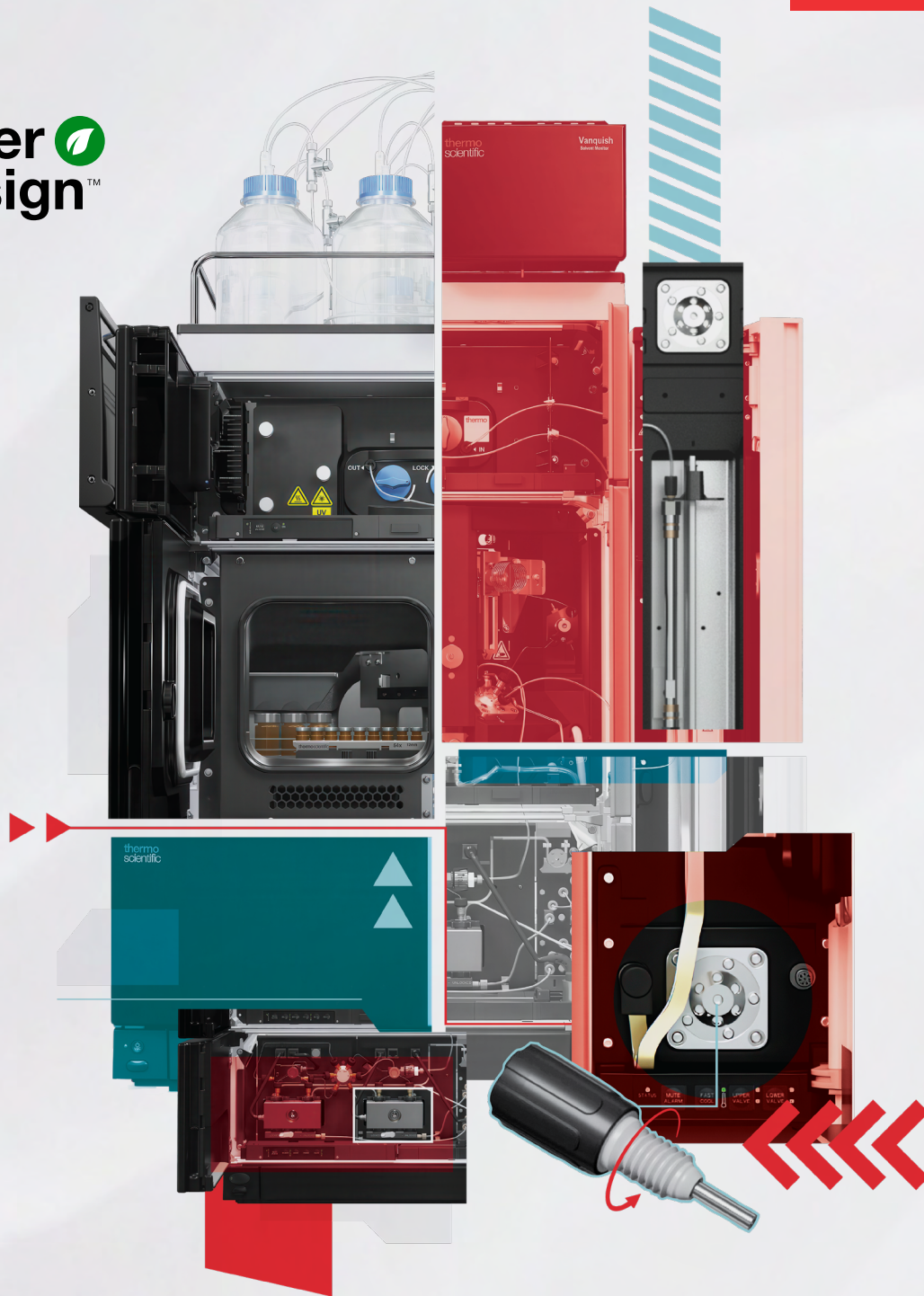


Greener 
by design™



Vanquish LC systems

Dependably different. Lab ready.

Put your analysis on a path to greatness with refined LC systems and torque-controlled fittings

thermo scientific

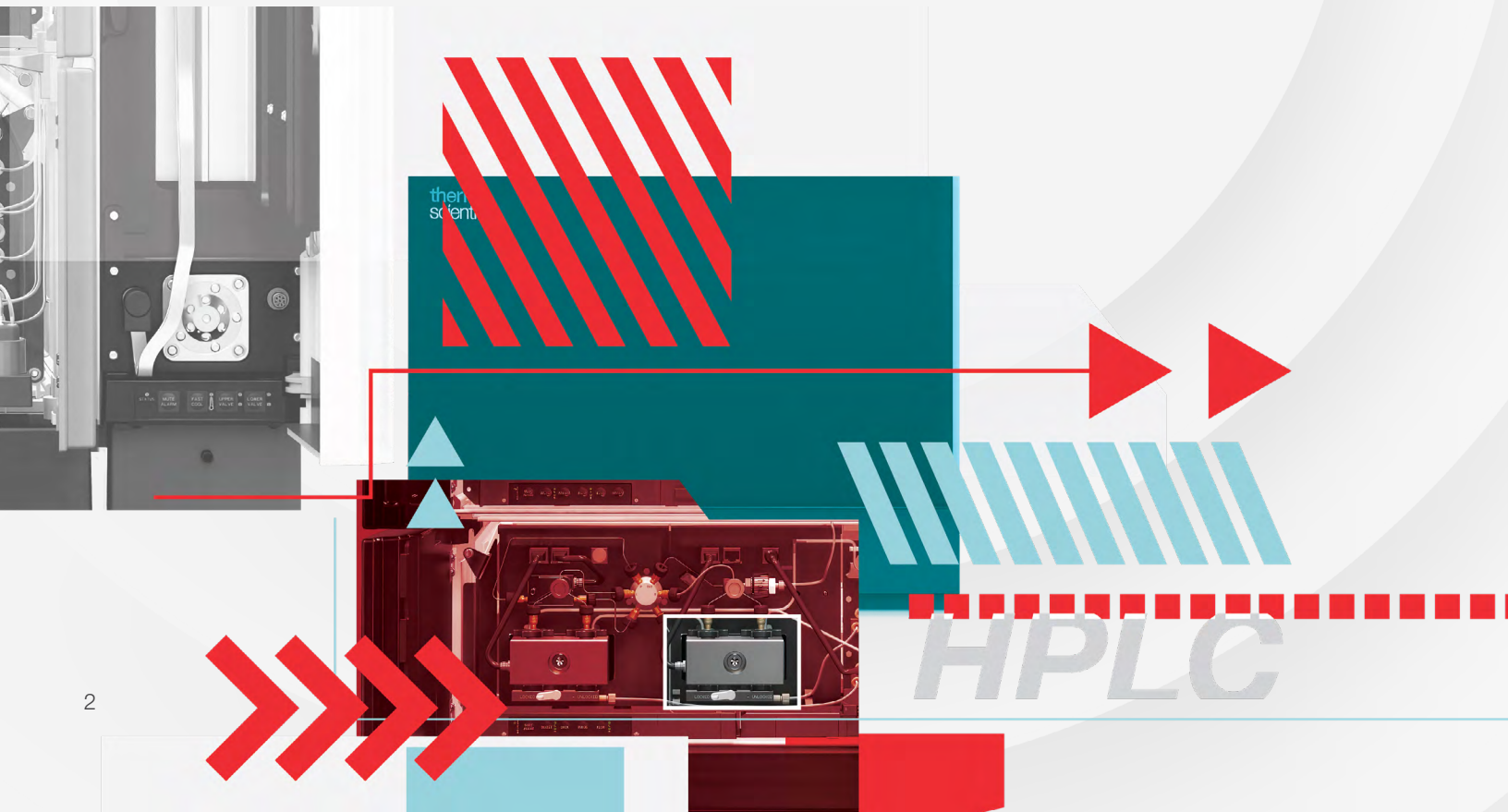
Get more from your liquid chromatography

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 LC 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
- **Designed with sustainability in mind**—Portfolio certified with the ACT® Ecolabel by My Green Lab® and polyvinyl chloride and polystyrene free secondary and tertiary packaging
- **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**—Use, control, and process data easily with Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS)
- **Enhanced robustness**—Higher robustness through Thermo Scientific™ Viper™ TQ UHPLC Fittings and improved pump wear parts



Run more samples, unattended

Designed for any application—whether HPLC or UHPLC, small or large molecules, simple or complex mixtures—the Vanquish LC 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 systems

Absolute dependability to enable worry-free applications



Thermo Scientific™ Vanquish™ Flex UHPLC systems

Complete flexibility for method development or fast and reliable UHPLC



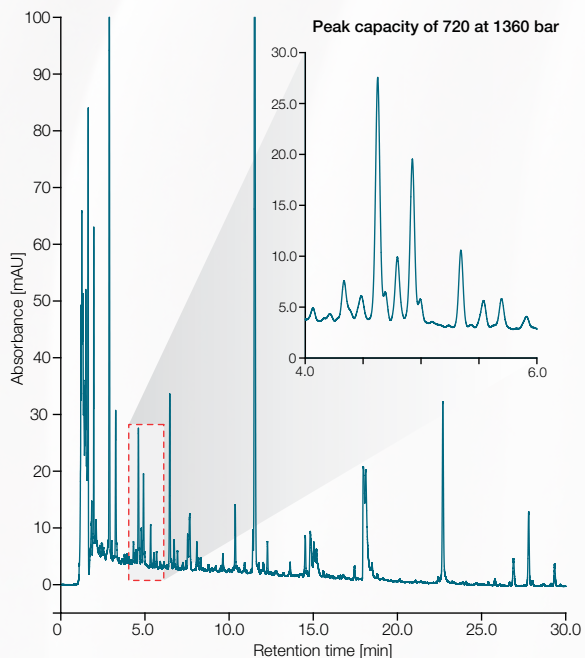
Thermo Scientific™ Vanquish™ Horizon UHPLC systems

Unrivalled performance and throughput for applications requiring high-end UHPLC

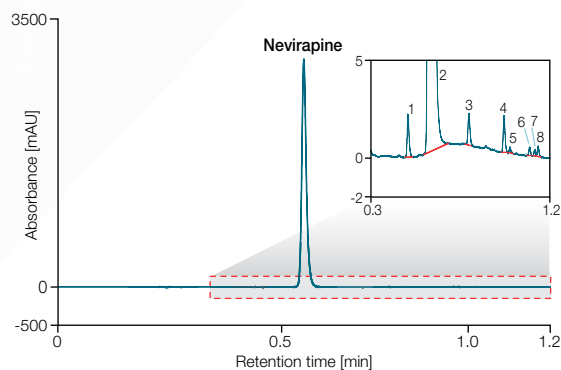
Deliver results without compromise

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, even with minimal available sample volume.



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

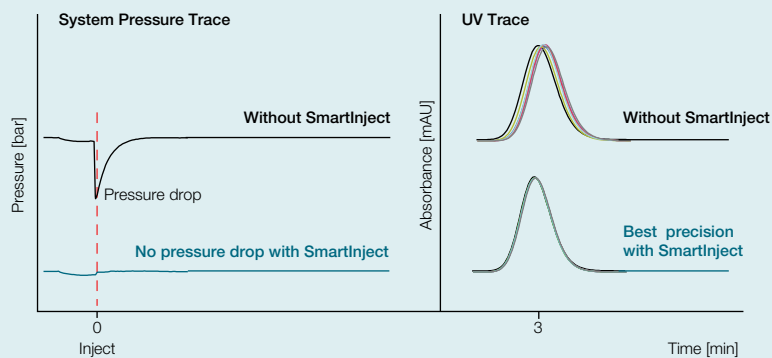


Impurity profiling of nevirapine (0.66 mg/mL) with UHPLC gradient and zoom into the baseline to show related impurities.

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 reducing cost of ownership.



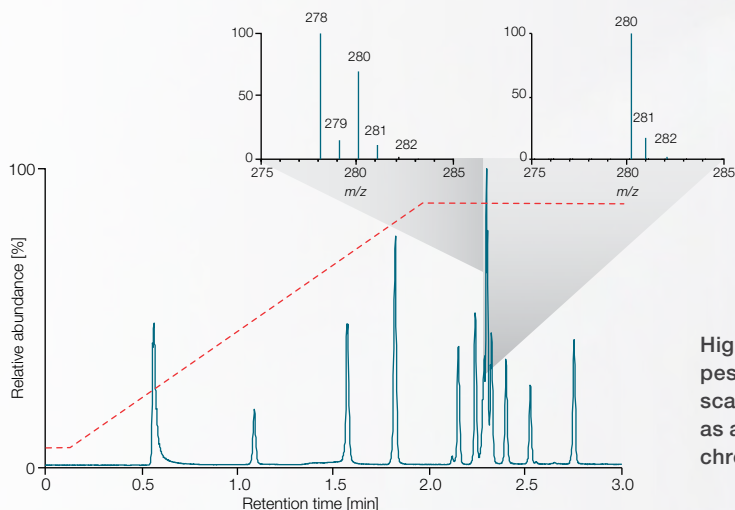
Significant reduction of pressure drop after sample injection using SmartInject Technology resulting in improved retention time reproducibility (six replicates) and enhanced column lifetime.



Easier method development and routine analysis

Vanquish Flex UHPLC systems

The Vanquish Flex UHPLC systems offer binary and quaternary solvent blending for normal and reversed-phase chromatography. 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.




High-throughput pesticide analysis by full scan LC-MS presented as an extracted ion chromatogram.



Vanquish Core HPLC systems

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 the ease to adopt within any given laboratory infrastructure make them ideal for all traditional HPLC analyses.



 = System Suitability Test (SST) passed

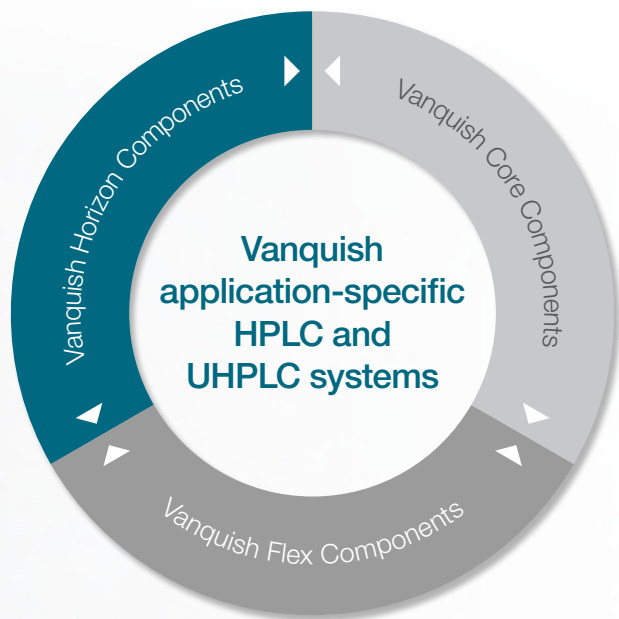


Test sites of a Vanquish Core HPLC system round robin test using eight different instruments with individual samples, users, and columns. Each analysis passed the specified SST criteria, highlighting the reliability of the instrument and the ease of use for each user—resulting in a successful SST.

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 LC 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 LC platform contains two unique dual modules, which are utilized for application-specific LC 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 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

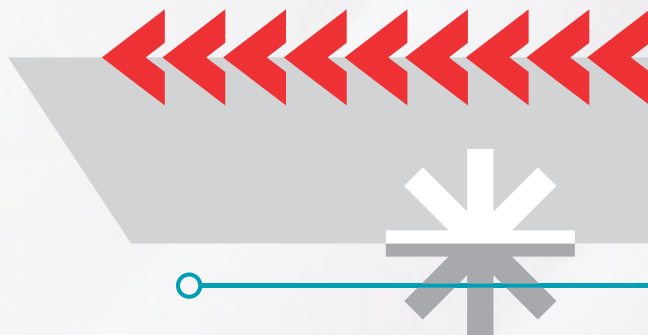
Match the separation power of Vanquish LC systems with compelling fractionation for high-purity and high-yield compound collection.



Accelerate your development

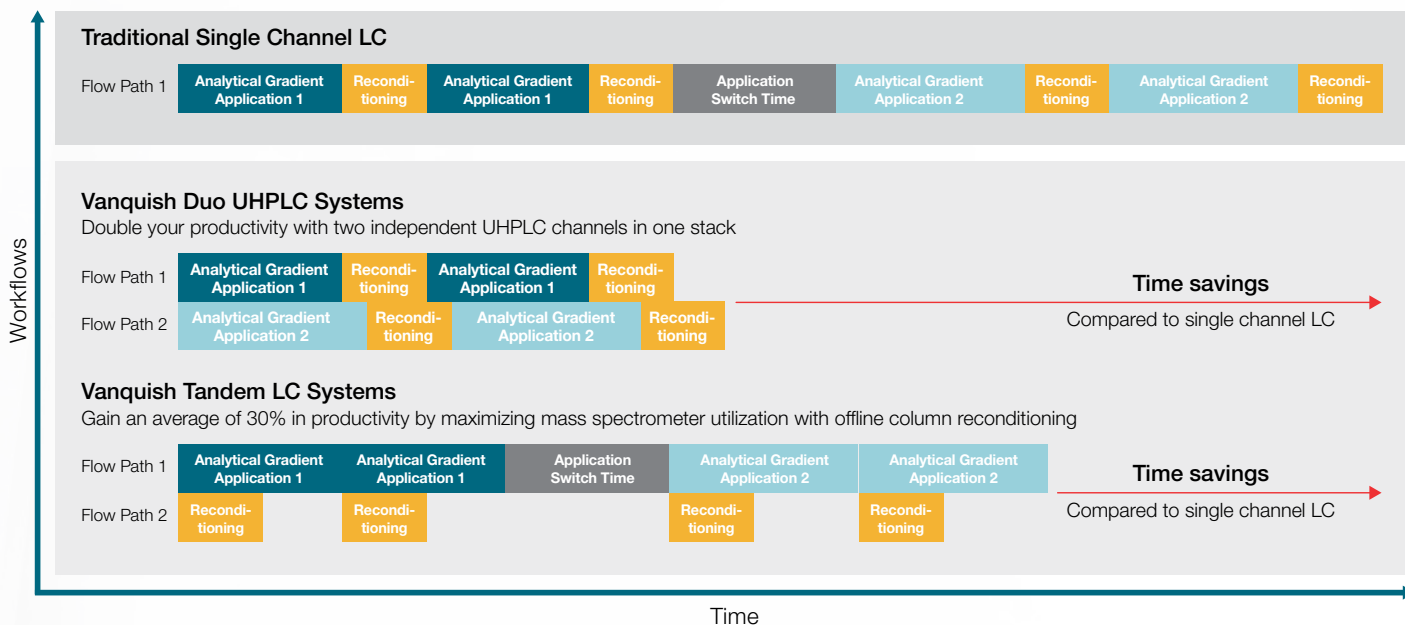
Thermo Scientific™ Vanquish™ Method Development HPLC and UHPLC systems

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 Thermo Scientific™ Vanquish™ Duo UHPLC systems. Two completely independent flow paths for maximum productivity.



Vanquish Tandem LC systems

Increase your lab's throughput by 30% with the Thermo Scientific™ 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 can be 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 and 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™ Trap Heart-Cut 2D-LC system

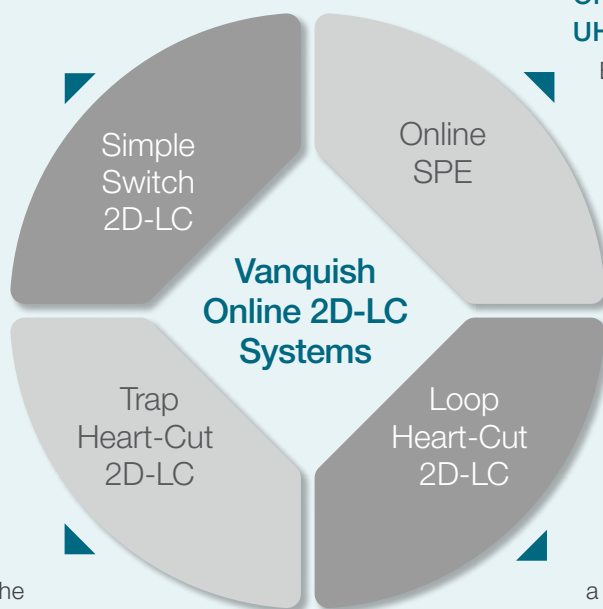
Transfer one or multiple fractions of the first dimension analytical column to a trap column before submitting to the second dimension for improved detection flexibility, such as making non-MS-compatible separations MS compatible.

Thermo Scientific™ Vanquish™ 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™ 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—even 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 the system can be customized to address your most demanding method development tasks, from chiral to large biomolecule separations.

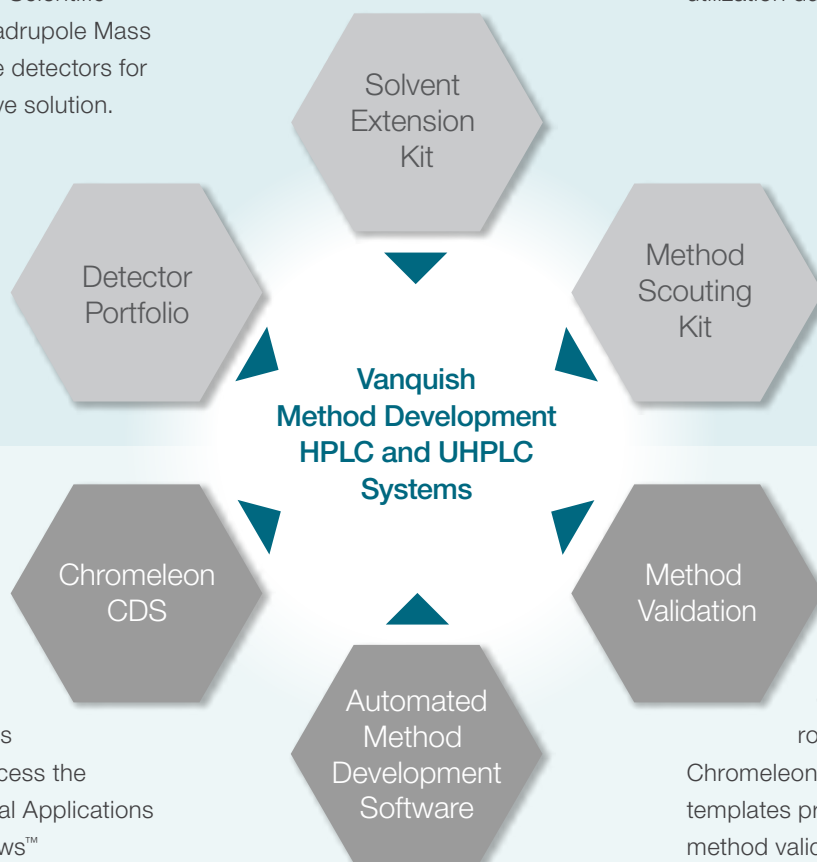
Vanquish Method Development HPLC and UHPLC systems

Hardware solutions

Enhanced confidence in method development with universal analyte detection using a charged aerosol detector and unrivaled peak tracking capabilities with the 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

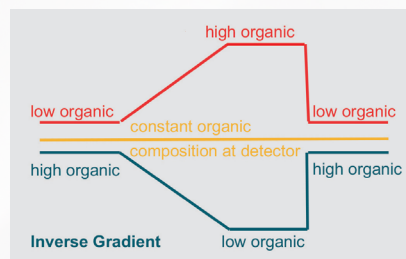


Improve your lab's quantification capabilities with Vanquish Inverse Gradient LC systems, employing the unique and universal charged aerosol detection to consistently quantify all non-volatile and semi-volatile compounds even when no reference standard is available.

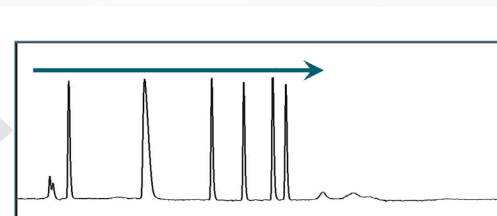
By utilizing a second pump to deliver an inverse gradient, the detector offers:

- Uniform response with charged aerosol detection under gradient elution conditions
- Simplified method setup with automatic inverse gradient calculation considering all system volumes
- Reliable standard-free quantification of knowns and unknowns

Analytical gradient



Inverse gradient compensation



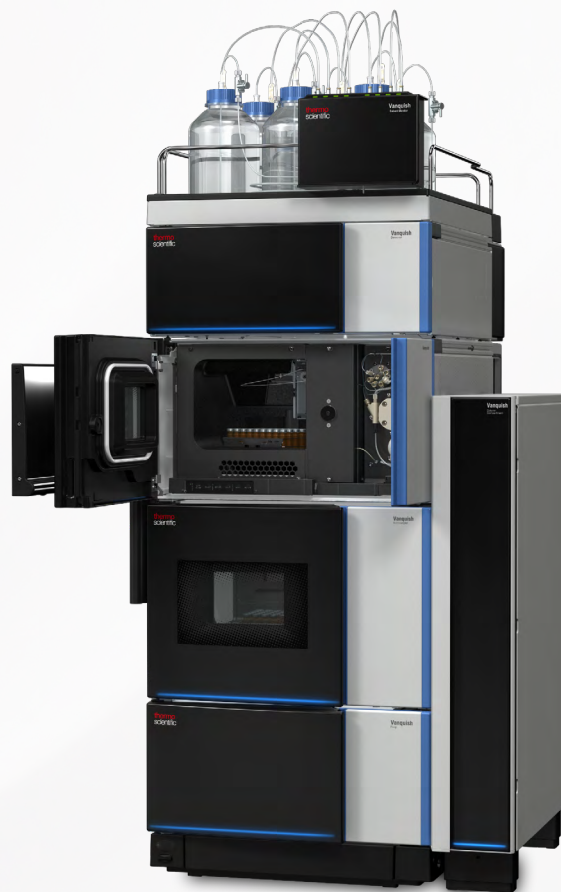
Purify your samples

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.

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 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



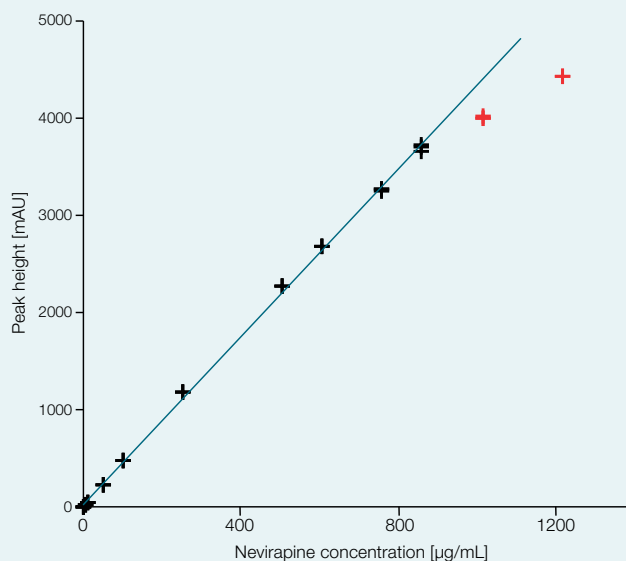
Detect the lowest sample quantities

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



Industry-leading diode array detection

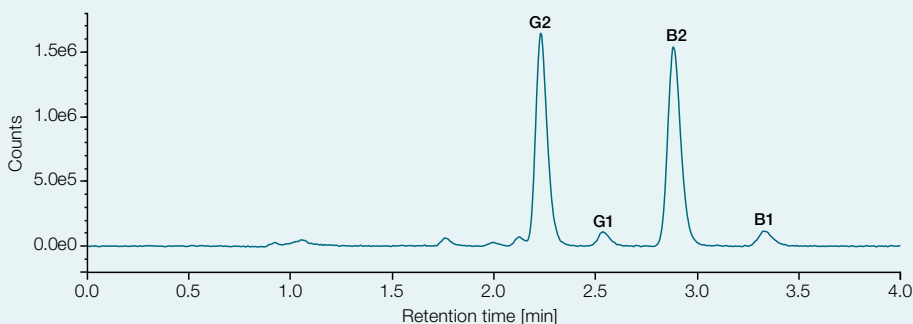
The Thermo Scientific™ Vanquish™ Diode Array Detector HL, with the Thermo Scientific™ LightPipe™ detection technology, delivers supreme analyte sensitivity through low baseline noise and longer effective light path by total internal reflection. The Thermo Scientific™ Vanquish™ Diode Array Detector FG offers advanced 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 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.

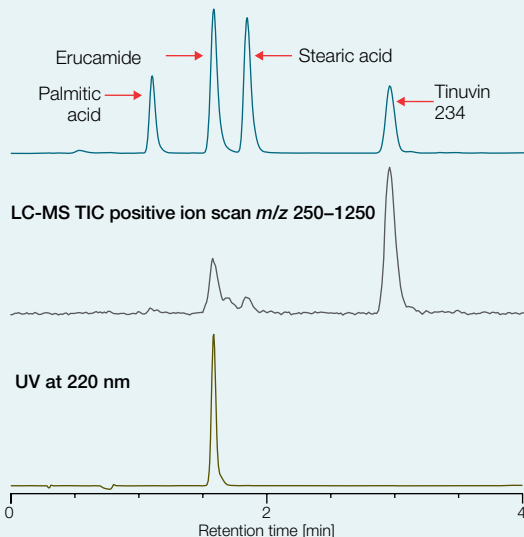
Detect the lowest sample quantities



Uniquely universal charged aerosol detection

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

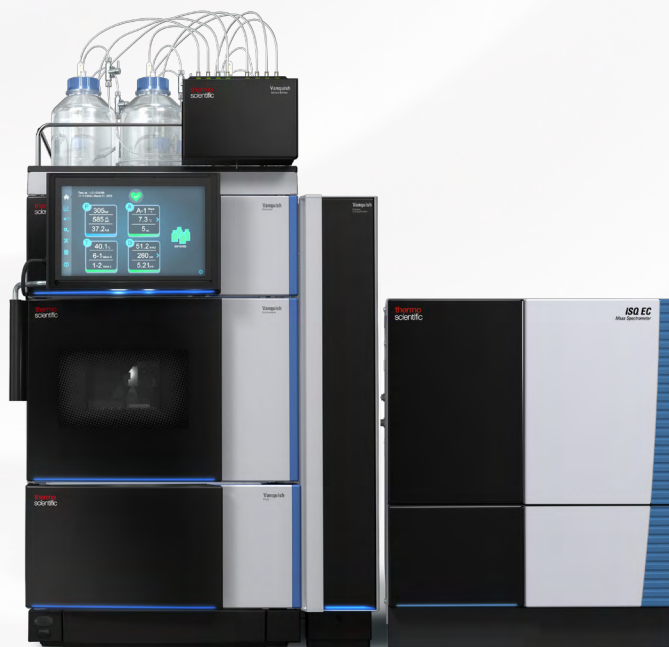
Charged Aerosol Detection



Unlike mass spectrometry (MS) and UV, the CAD can measure all analytes in a sample. 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

MS gives access to valuable data no other technology can deliver. The easy-to-use Thermo Scientific™ ISQ™ EM Single Quadrupole Mass Spectrometer and the Thermo Scientific™ ISQ™ EC Single Quadrupole Mass Spectrometer integrate 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. MS 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 including the high sample capacity Thermo Scientific™ Vanquish™ Sample Hub with the Thermo Scientific™ Orbitrap™ Excedion Pro Mass Spectrometer.

Face Sealing Technology
for highest robustness

Ergonomic design
for improved grip



Integrated torque-controlled
fingertightening mechanism
for leak-free connections

Audible click and
tactile feedback
for confidence

The best LC connection just got better

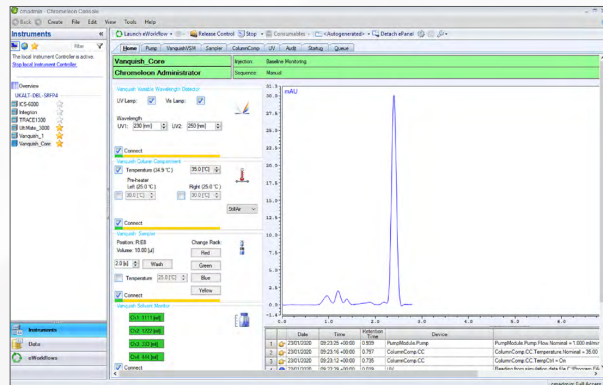
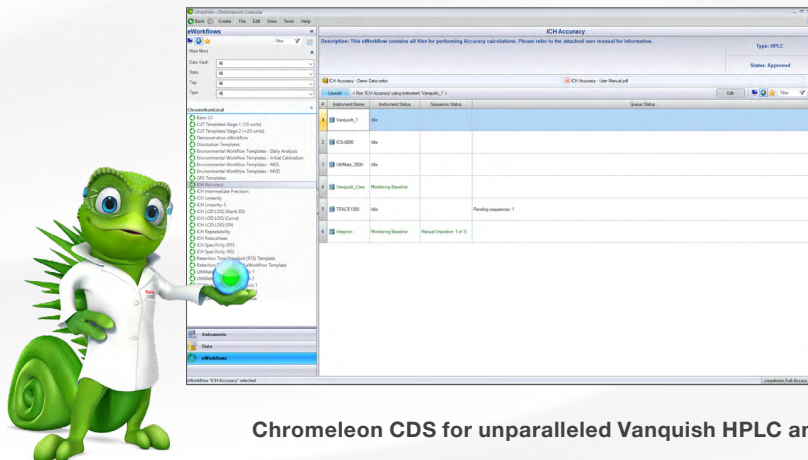
Thermo Scientific™ Viper™ Fingertight Fittings revolutionized LC connections more than a decade ago. Now, the all-new Thermo Scientific Viper TQ UHPLC Fittings set new standards for the easiest and most durable fluidic connections in liquid chromatography. Featuring a torque-controlled design, these fittings provide an audible click and tactile feedback when a secure sealing is achieved. Remarkably, the new fittings can be used for over 300 connections, ensuring long-lasting performance and reliability.

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.

The software 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.



Chromeleon CDS for unparalleled Vanquish HPLC and UHPLC system control.



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 Thermo Scientific™ Vanquish™ LC columns partner with the Vanquish LC 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 your LC run robustly and routinely.



Thermo Scientific LC portfolio overview

Analytical HPLC and UHPLC				Nano-, cap-, micro-flow UHPLC
Application-specific HPLC and UHPLC				
<p>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 systems Thermo Scientific™ Transcend™ UHPLC systems</p>				
Dependability	Flexibility	Performance	Sensitivity	
 <p>Thermo Scientific™ Vanquish™ Core HPLC systems</p> <ul style="list-style-type: none"> High-pressure binary and low-pressure quaternary solvent blending or isocratic flow delivery Workhorse instrument Seamless method transfer System intelligence for improved productivity 	 <p>Thermo Scientific™ Vanquish™ Flex UHPLC systems</p> <ul style="list-style-type: none"> High-pressure binary and low-pressure quaternary solvent blending Biocompatible Unparalleled flexibility and control 	 <p>Thermo Scientific™ Vanquish™ Horizon UHPLC system</p> <ul style="list-style-type: none"> High-pressure binary solvent blending Biocompatible Industry-leading specifications Unmatched detection sensitivity 	 <p>Thermo Scientific™ Vanquish™ Neo UHPLC system</p> <ul style="list-style-type: none"> All-in-one nano-, capillary-, and micro-flow LC system Accelerating productivity with long-term, trouble-free operation Intelligent at-system or remote control, method setup, diagnostics, and troubleshooting 	
 <p>Certified with ACT Ecolabel 2.0</p>				
700 bar		1000 bar		1500 bar

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