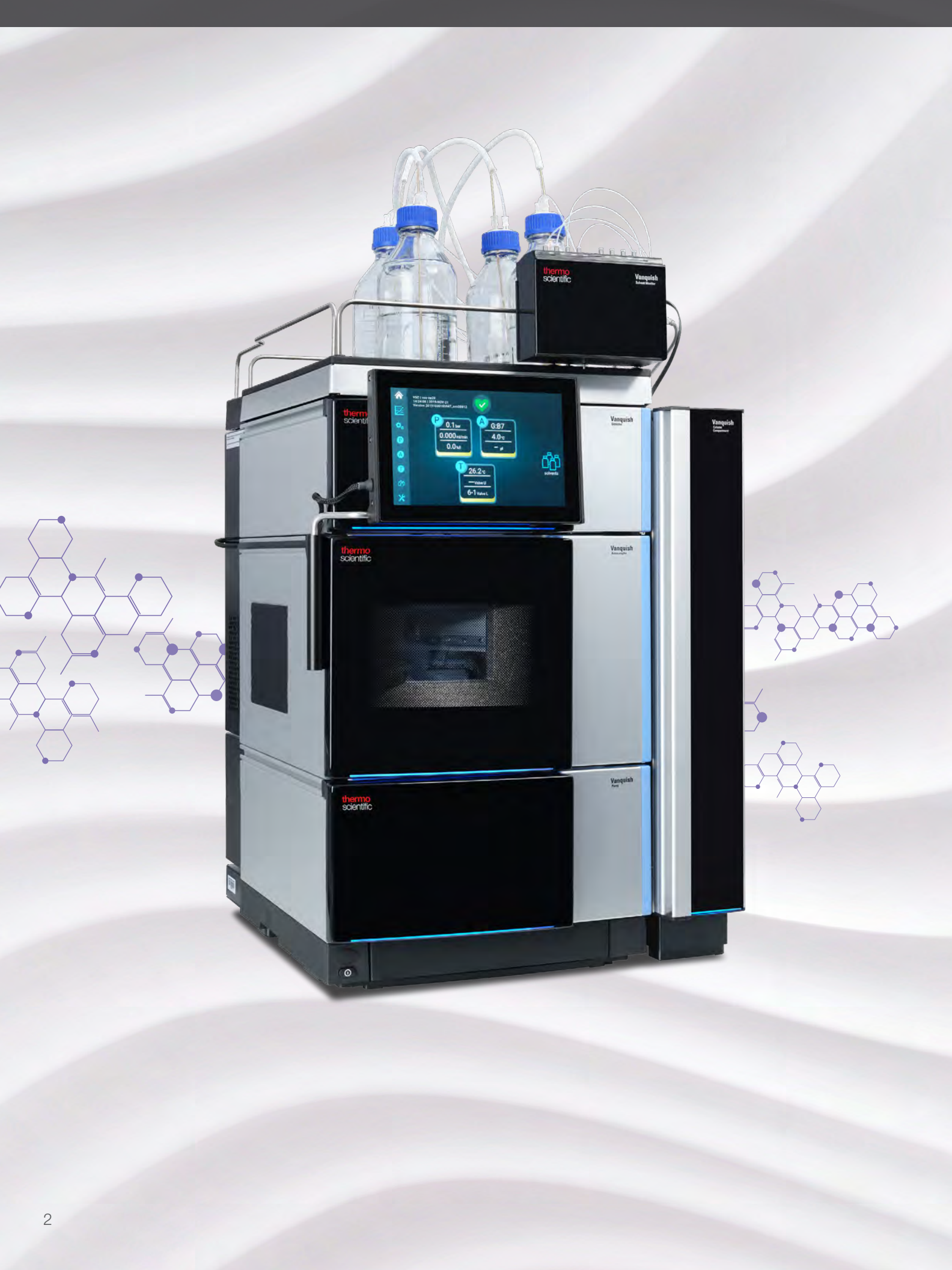




Vanquish Flex UHPLC Systems

Complete flexibility



Succeed with flexibility

Whether you are analyzing innovative biotherapeutics or novel chemical medicines, method development with Thermo Scientific™ Vanquish™ Flex™ UHPLC system has never been easier.

More than 30 years of liquid chromatography expertise has led to the Vanquish Flex UHPLC system, bringing exceptional analytical precision, detector sensitivity and operational simplicity to enable unprecedented robustness and flexibility. Designed for the needs of UHPLC and LC-MS scientists, Vanquish Flex UHPLC systems provide:

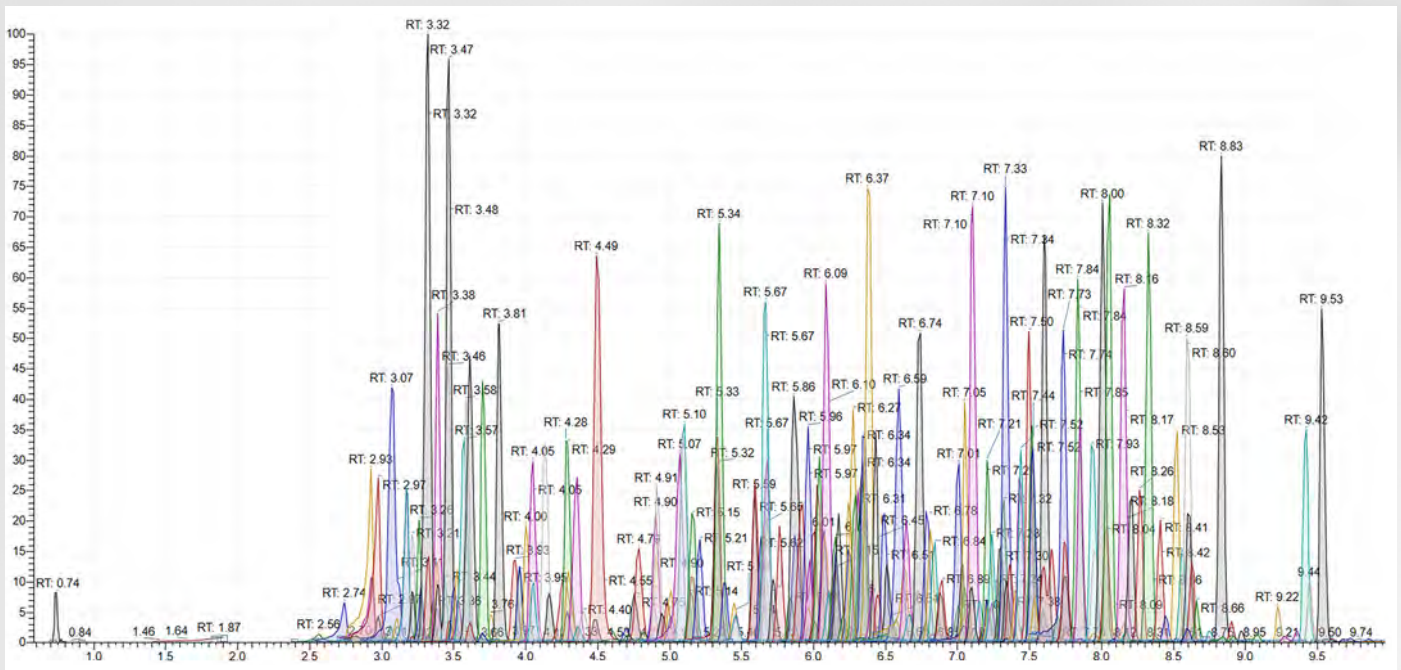
- Unparalleled flexibility to meet all needs of routine UHPLC applications
- Seamless integration with the broad Thermo Scientific LC-MS portfolio
- Fast, automated, and comprehensive method development
- Full biocompatibility to address the most challenging biotherapeutic applications
- Easy instrument familiarization with intuitive system operation and simplified user maintenance
- Simple integration with your Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS), Waters™ Empower™ 3 CDS and Agilent™ OpenLab™ CDS software



Full flexibility for your UHPLC applications

In your laboratory, each analytical question brings a new challenge. Vanquish Flex UHPLC systems are an essential analytical tool to help you solve each of these challenges, bringing a choice of technology to move your innovation forward:

- Three pump types to meet your throughput, flexibility, or advanced workflow requirements
- Five alternative detection principles
- Seamless integration with the Thermo Scientific mass spectrometry portfolio
- Biocompatibility for even the most challenging eluents
- Unique 2D-LC workflows covering single and multiple heart-cut LC as well as on-line SPE



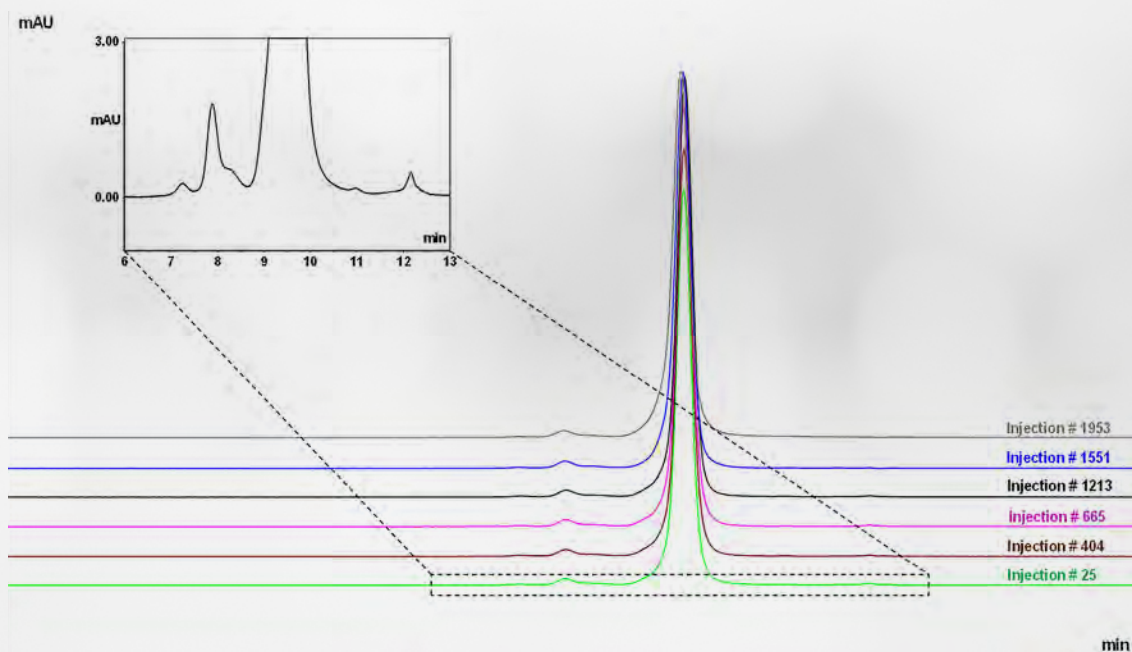
Extracted ion chromatogram of a matrix extracted spike (MES) of over 200 pesticide residues in baby food at 10 ng/g.



Biocompatibility for full application range

Whether you run traditional HPLC applications or high-efficiency UHPLC applications; no matter if you analyze small molecules or innovative biopharmaceuticals; the Vanquish Flex UHPLC system can meet your separation requirements. With fully biocompatible fluidics the Vanquish Flex UHPLC systems provide:

- High salt eluent compatibility
- Corrosion-free fluidic path
- Virtually eliminated interaction of analytes with leaching iron ions

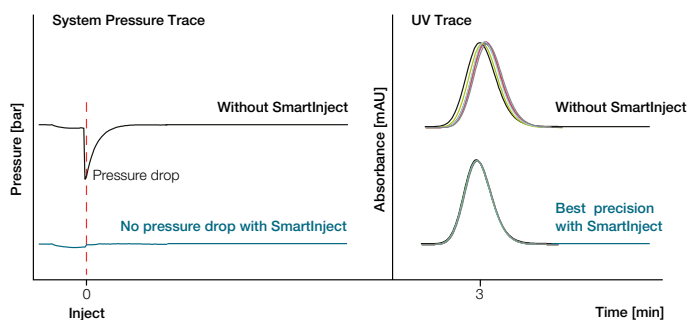


Aggregate analysis of bevacizumab using a Thermo Scientific™ MAbPac™ SEC-1 HPLC column (4.0 × 300 mm) allowing over nearly 2000 injections on the same column. Column lifetime is improved by SmartInject Technology.

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.

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



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

Develop with flexibility

Liquid chromatography method development is a time-consuming process, usually requiring expert knowledge. With Vanquish Flex UHPLC systems your laboratory can significantly accelerate method development by taking advantage of a high degree of automation and utilization of sub-2 μm particle size columns.

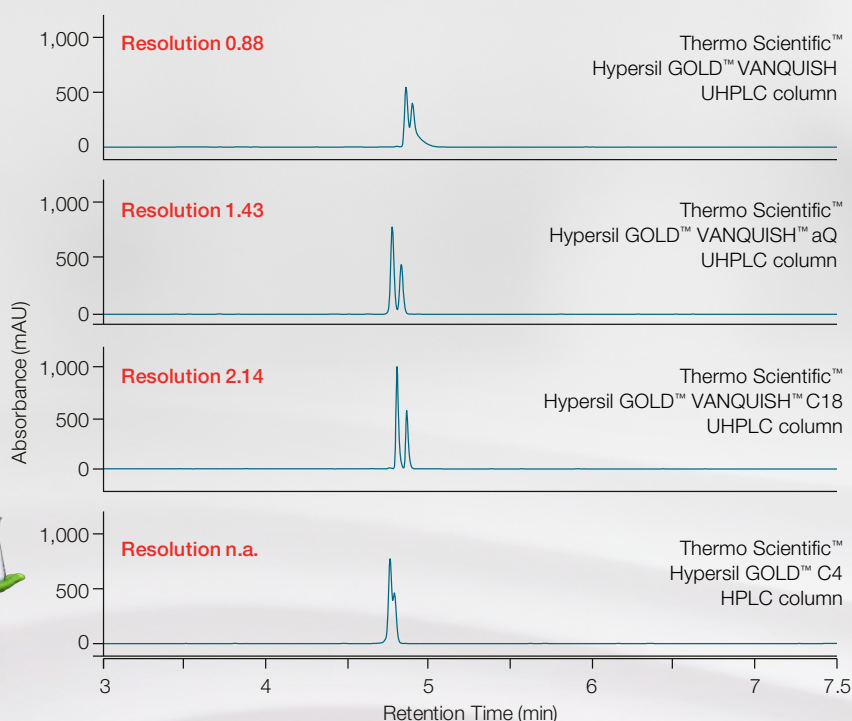
Automated method scouting

Automated method scouting on Vanquish Flex UHPLC systems provide:

- Sequential scouting of up to six different column chemistries
- Wide eluent scouting capabilities
- Easy to use and efficient data processing tools

Automate method development

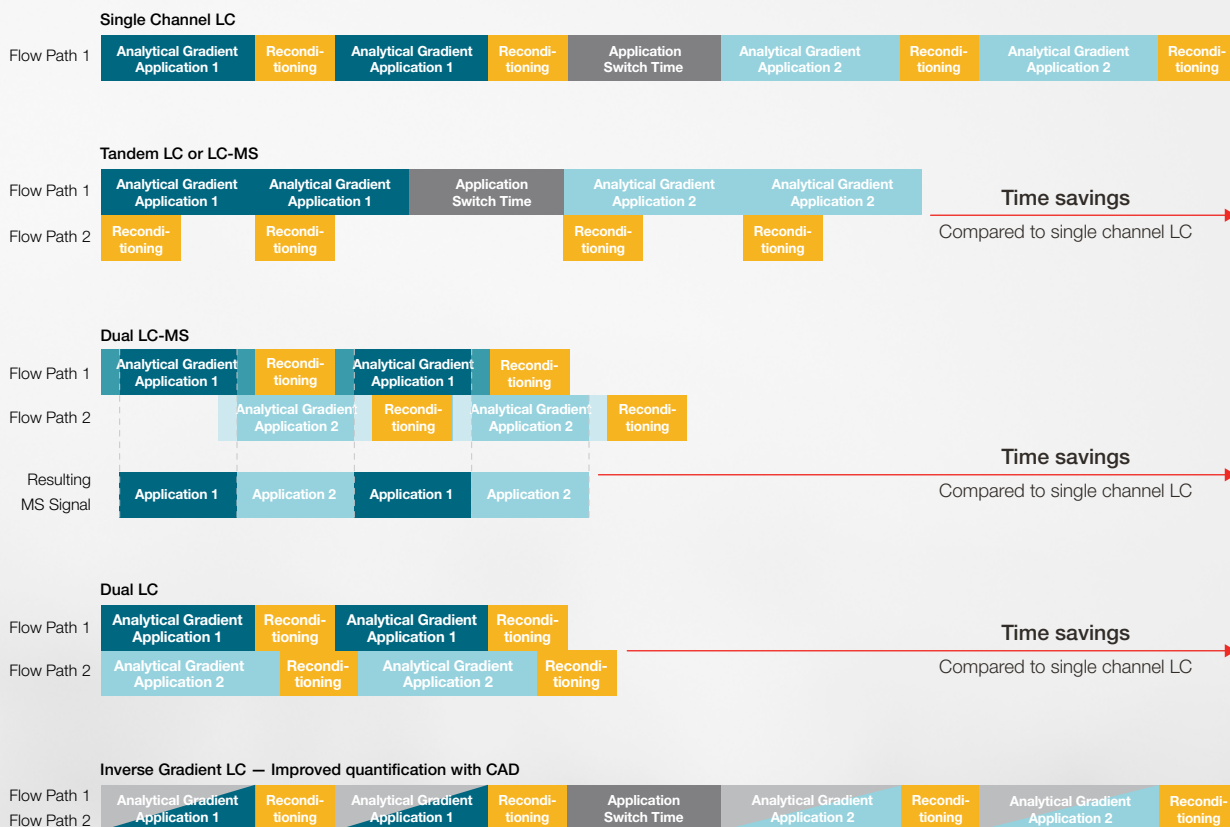
The combination of Chromeleon CDS with ChromSwordAuto™ software provides a complete solution from method development to method validation. Enabling automated optimization to develop and improve methods faster and more efficiently with tools to make compliance easier.



Automatic scouting of different column chemistries for fastest method development.



Improve with flexibility



Thermo Scientific Vanquish Duo for Dual LC

Double your throughput, deepen your sample knowledge, and better utilize your bench space with the Thermo Scientific™ Vanquish™ Duo for Dual LC workflow. Two completely independent flow paths for maximum productivity.

Vanquish Duo for Dual LC-MS

Double the throughput of your LC-MS application with the Vanquish Duo for Dual LC-MS. Run up to two applications simultaneously with a multi-channel LC while benefiting from the robustness, performance, and ease-of-use inherent of the Vanquish LC platform.

Vanquish Duo for Tandem LC or LC-MS

Increase your lab's throughput by 30% with the Vanquish Duo for Tandem LC or LC-MS workflow.¹ Maximize the utilization of your optical detector or mass spectrometer.*

* TN72203: Tandem UHPLC operation for high-throughput LC-MS peptide mapping analyses.

Vanquish Duo for Inverse Gradient LC

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

Enable your operators

In today's analytical laboratory environment, your scientific personnel have limited time for in-depth familiarization with new instrumentation. An LC system should seamlessly fit into your existing workflows and processes without requiring extra training or expertise.

The Vanquish Flex UHPLC system brings ease of use to a new level, enabling every user to deliver exceptional results, independent of user experience.



- Thermo Scientific™ Viper™ Fingertight Fittings for nearly zero dead-volume fluidic connections
- Automatic and remote instrument purging
- Thermo Scientific™ Vanquish™ Solvent Monitor to ensure enough eluent and waste capacity for every sequence
- Vanquish User Interface to provide direct, at-instrument monitoring of system status and support for operator-controlled maintenance



Vanquish Solvent Monitor

The Vanquish Solvent Monitor enables Vanquish HPLC and UHPLC systems to accurately and automatically measure the liquid levels in each individual solvent channel and waste container.

Deep integration of the Vanquish Solvent Monitor into the Vanquish Flex system provides direct viewing of solvent and waste volumes within Chromeleon CDS, on the Vanquish User Interface, and directly on the module itself.

Run large sample sets with confidence, avoid lost time, and eliminate procedural deviations by monitoring mobile phase levels; prevent hazardous spills by monitoring waste levels.

Vanquish Solvent Monitor manages your eluent and waste level for highest confidence during analysis.



Monitor your instrument

The interactive Vanquish User Interface allows operators to intuitively, immediately, and intelligently monitor the current system status:

- Fulfills compliance needs with a direct interface to the system without the need for a network connection
- Glove-enabled and solvent resistant touch display
- Status display of current instrument parameters, such as flow and pressure
- Monitoring of column equilibration progress through graphical representation of pump pressure data
- Display of step-by-step maintenance videos
- Remote instrument monitoring, even without CDS
- Multi-language support

Vanquish User Interface



On-instrument maintenance instructions



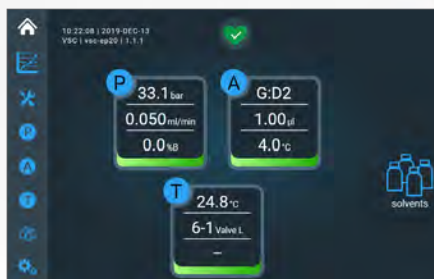
Multi-language support



Instrument equilibration monitoring



Direct solvent level display



Instrument status display



Use your existing software infrastructure for implementation

Regardless of your current software infrastructure, you can take advantage of the latest innovation of the Vanquish Flex UHPLC systems. Vanquish Flex systems combine perfectly with Chromeleon CDS to take advantage of the unrivaled flexibility, precision and ease-of-use.



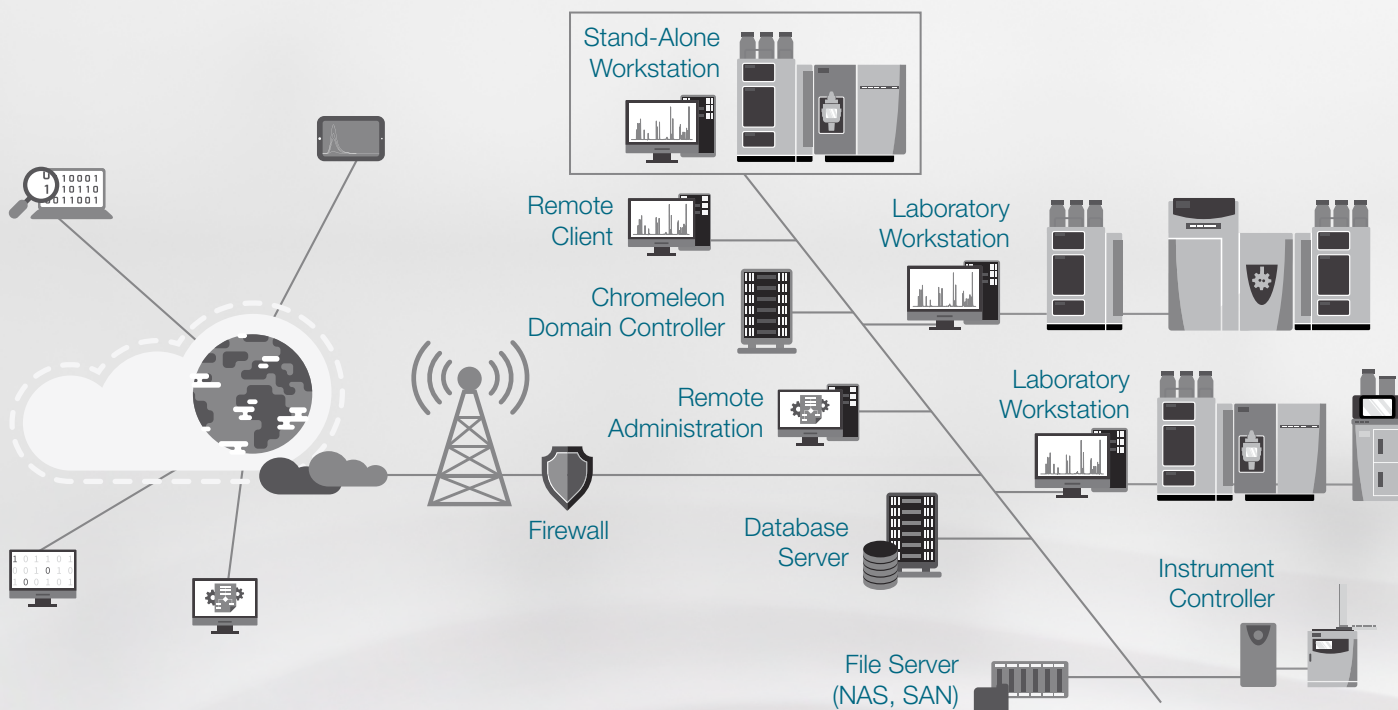
Chromeleon CDS

Scalable from workstation to global enterprise, Chromeleon CDS provides complete instrument control, data acquisition, data processing and data security regardless of whether you work with the most recent feature release, the extended support or the long-term support software version.



Standard Instrument Integration (SII) for Empower 3 and OpenLab software

Enabling seamless instrument control and method creation for all laboratories currently employing Waters Empower CDS and Agilent OpenLab CDS software.



Network scalability—stand-alone to a global network with secure central data storage.

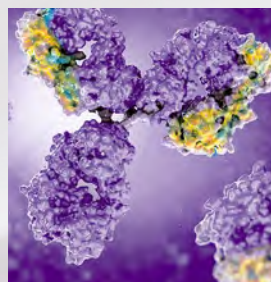
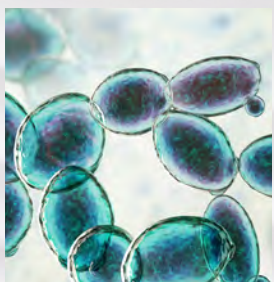
Benefit from highly-sensitive and selective mass spectrometry

Mass spectrometry is a prevalent tool in many laboratories. The Vanquish Flex UHPLC system can be seamlessly coupled to best in class Thermo Scientific triple quadrupole or Thermo Scientific high-resolution accurate mass Orbitrap mass spectrometers. For single point control, your LC-MS system can be controlled completely by Chromeleon CDS.

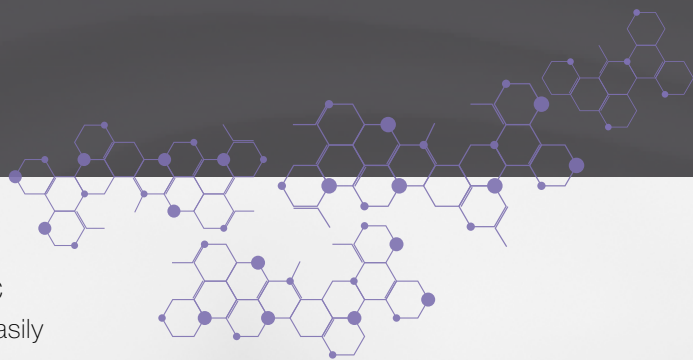
- Best in-class retention time precision for optimal selected reaction monitoring
- Superior separation for a minimal ion suppression
- Minimum carry-over for reliable trace level LC-MS quantification



The Vanquish Flex with the Thermo Scientific™ TSO Quantis™ Triple Quadrupole mass spectrometer.



Detect your analyte

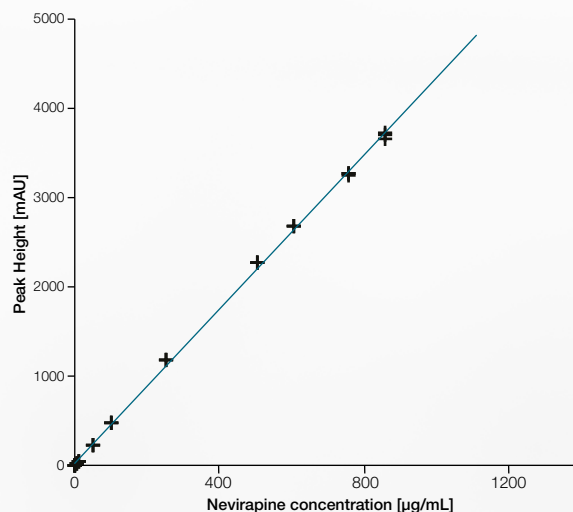


Choosing the right detection technology is key to revealing all the components of interest in your sample. The Vanquish Flex UHPLC systems offer a wide range of detection capabilities that can be easily integrated and combined to fit your methods.



Industry-leading diode array detection

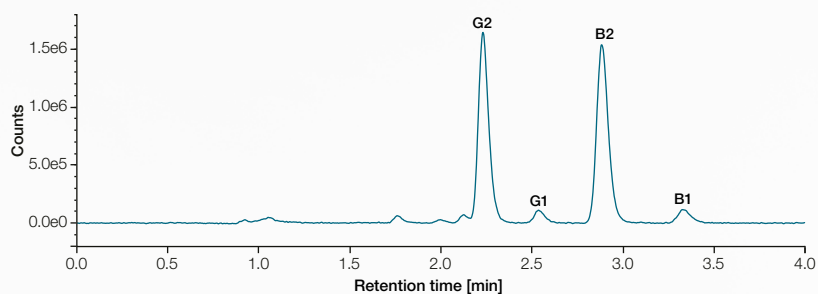
Thermo Scientific LightPipe™ Vanquish Diode Array Detector HL delivers you supreme analyte sensitivity by a low baseline noise and low dispersion. The Thermo Scientific Vanquish Diode Array Detector FG offers cutting edge detector linearity as well as a smooth and robust LC-MS integration. Based on diode 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 and selectivity.

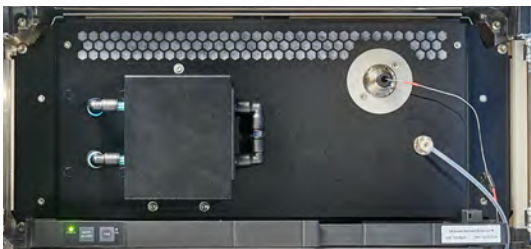


FLD chromatogram of the four aflatoxins: G2, G1, B2 and B1 at a concentration of 0.9 µg/kg for G2 and B2 and 2.9 µg/kg for G1 and B1.

Variable wavelength detection

UV-Vis detection with excellent sensitivity and linearity is a cost-effective and powerful solution for quantitative compound analysis.

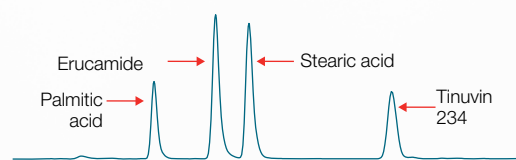




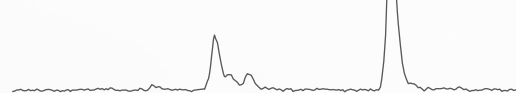
Unique universal charged aerosol detection

The Thermo Scientific™ Vanquish™ charged aerosol detectors (CAD) are 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.

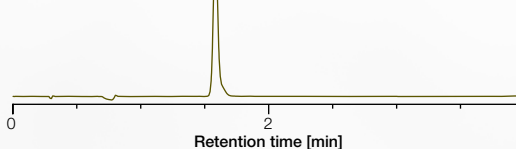
Charged Aerosol Detection



LC-MS TIC positive ionscan m/z 250–1250



UV at 220 nm



Unlike mass spectrometry and UV, the CAD is able to measure all analytes in the 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.



Simple mass detection

Mass spectrometry gives access to valuable data no other technology can deliver. The easy to use Thermo Scientific™ ISQ™ EM single quadrupole mass spectrometer or the Thermo Scientific™ 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 more flexibility. Integrated software allows both novices and experts to quickly master MS to gain more insights from every sample.



Pairing smoothly with your LC-MS

LC-MS quantification is a widely used technology in many application fields, including food safety and environmental monitoring. In conjunction with the Thermo Scientific mass spectrometer portfolio, Vanquish Flex delivers a great solution for ultra-sensitive detection. For control of your LC-MS setup you can choose between the feature-rich Thermo Scientific™ Xcalibur™ software, the powerful Thermo Scientific™ TraceFinder™ software or the compliance-ready Chromeleon CDS control.



Innovating for you



2



11





1 Vanquish Solvent Monitor

Use the Vanquish Solvent Monitor to increase your regulatory compliance, productivity, and safety of your laboratory. That device guarantees that your HPLC systems will never run dry and the waste will not spill over, reducing loss of valuable measurement time and sample material.

2 Vanquish User Interface

With the Vanquish User Interface, you are the master of your LC instrument. The display always shows you the key parameters of your instrument such as flow and pressure and guides you in a visual step-by-step video tutorial through key maintenance tasks.

3 Detection capabilities

Differing molecular characteristics of your analyte, from small molecules to complex biomolecules, necessitates multiple detector technologies. The Vanquish Flex UHPLC systems have been built to utilize a wide range of analytical detectors, including mass spectrometry (MS), diode array detection (DAD), multi wavelength detection (MWD), charged aerosol detection (CAD), variable wavelength detection (VWD), and fluorescence detection (FLD).

4 SmartInject Technology

Superior retention time precision and accuracy, as well as enhanced column protection.

5 Proprietary injection and switching valves

The valves used in the Vanquish Flex UHPLC systems are designed to meet the reliability needs to make HPLC run robustly and routinely. The valves are long-life and follow a no maintenance philosophy reducing your overall cost of ownership.

6 Easier operation

Utilizes tool-free Thermo Scientific Viper Fingertight Fittings with near-zero dead volume operation and ergonomic design.



7 Simple maintenance

Modules can be repaired without de-stacking; each unit has handles for ease of maneuvers; light bars on the front of the system indicate system status; and the entire system supports tool-free maintenance.

8 Keep your lab tidy

The built-in drawer stores accessories, related documents, or any other useful material for the system.

9 Higher data confidence

Highest injection precision for even lowest injection volumes and retention time precision for reliable qualitative and quantitative sample characterization.

10 Biocompatibility

Vanquish Flex UHPLC Systems are by design biocompatible to deal with all challenging eluents for biopharmaceutical characterization increasing data confidence and instrument uptime.

11 Compatible with your software infrastructure

Vanquish Flex UHPLC System can be operated in various software environments including the latest Chromeleon software feature release, Chromeleon CDS long-term and extended support version, Waters Empower and Agilent OpenLab CDS.

Thermo Scientific LC Portfolio Overview

HPLC systems

Routine analysis

UHPLC systems

Method development

Research and high throughput

Thermo Scientific Vanquish Duo HPLC and UHPLC system workflows

Thermo Scientific™ Vanquish™ Core™ HPLC system

- Workhorse instrument to dependably deliver results
- System intelligence for improved productivity
- Seamless method transfer
- Low pressure, high pressure, and isocratic solvent blending



700 bar

Thermo Scientific Vanquish Flex UHPLC system

- Unparalleled flexibility and control
- High throughput, high sensitivity
- Low pressure and high pressure solvent blending



1000 bar

Thermo Scientific™ Vanquish™ Horizon UHPLC system

- Industry-leading precision and accuracy in delivering sample information
- Unmatched detection, sensitivity and speed
- Truly future-proof with specifications far in excess of all others
- Optimizes the benefits of LC-MS analysis



1500 bar

The collective power of chromatography

LC that takes your productivity to new heights



Find out more at thermofisher.com/vanquishflex