

thermo scientific

Vanquish Duo UHPLC Systems



Separate your productivity from
the status quo

ThermoFisher
SCIENTIFIC

Three workflows. Two flow paths. One integrated solution.

In today's challenging research and production environments, companies are being asked to be more productive without increasing spending, or compromising quality. At the same time advancements and innovations are needed to improve operational efficiency and performance. How do you accomplish this? It's easy with the new Thermo Scientific™ Vanquish™ Duo UHPLC systems built for enhanced productivity.

Using the Vanquish Duo UHPLC systems you will gain all the benefits of the Vanquish platform in performance, robustness and ease-of-use with increased productivity, up-time, sample knowledge and faster return on investment.

- Reduce your cost per sample
- Benefit from the robustness built into the Vanquish platform
- Free up valuable bench space
- Increase sample throughput
- Enhance qualitative and quantitative sample knowledge
- Streamline your workflows using intelligent software tools



Vanquish Duo system for Tandem LC or LC-MS

Improve your return on investment by increasing sample throughput and maximizing detector/mass spectrometer utilization.



Vanquish Duo system for Dual LC

Run two applications simultaneously on a single instrument, whether they are identical or different analyses, for doubled throughput or deeper sample knowledge.



Vanquish Duo system for Inverse Gradient

Improve your ability to detect and quantify all compounds in your sample with universal Charged Aerosol Detection, even without standards, and see what you've been missing.

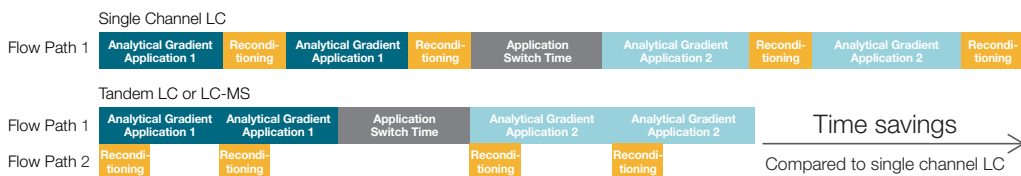


Vanquish Duo System for Tandem LC or LC-MS

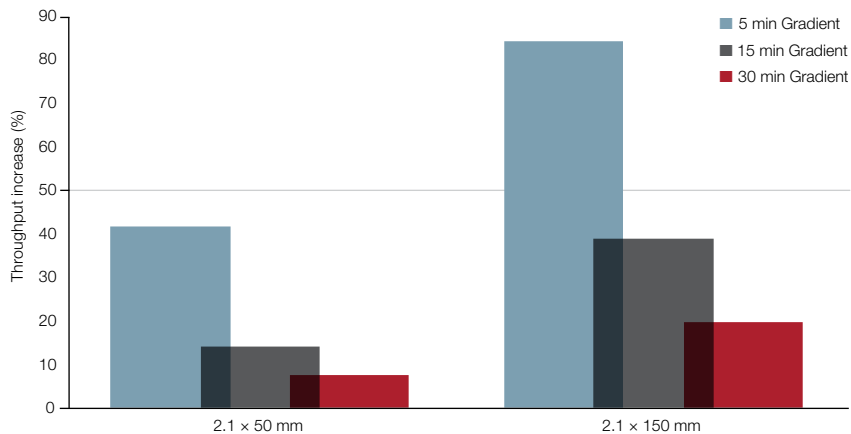
Maximize mass spectrometer utilization

Gradient separations are commonly used in LC or LC-MS. Column reconditioning, such as washing and re-equilibration, takes time and reduces your overall sample throughput. The Vanquish Duo system for Tandem LC or LC-MS eliminates these limitations and improves productivity by:

- Increasing sample throughput without modifying a validated method
- Improving return on investment by maximizing the instrument utilization
- Reducing column carry over through extended column washing without sacrificing throughput
- Simplifying method setup with automatic method conversion from your original gradient method



Throughput increase by Tandem LC or LC-MS



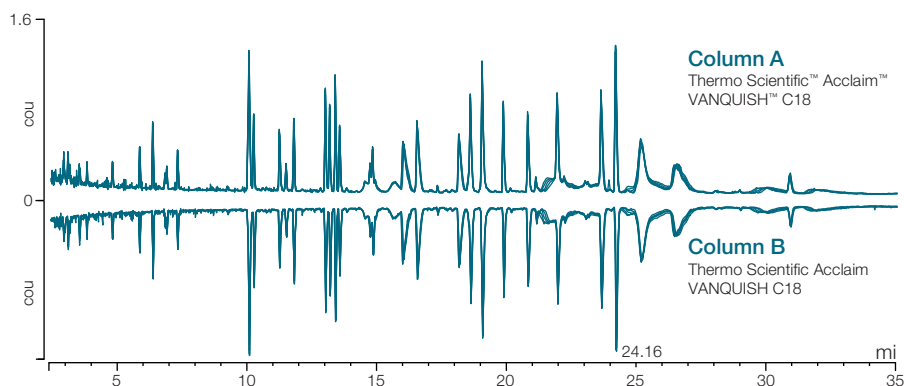
Throughput increase by Tandem LC or LC-MS is between 10–80% for most common conditions.

“Since installing the Tandem LC-MS system we have doubled our throughput and increased the precision of our data!”

Dr. Richard Rogers
Just Biotherapeutics, Inc.



The Vanquish Duo system for Tandem LC or LC-MS splits the analysis between two pumps and two columns. One pump delivers the analytical gradient while the second pump runs the reconditioning gradient. This configuration allows you to use two identical columns to run your sequence faster without compromising data quality.



Reproducible results for the Thermo Scientific™ Vanquish™ Horizon Duo UHPLC system for Tandem LC or LC-MS—Thermo Scientific™ Q Exactive™ HF hybrid quadrupole-Orbitrap™ mass spectrometer showing an overlay of five total ion current chromatograms. The sample shown is digested Infiximab using the Thermo Scientific™ SMART™ Digest Kit.

Simply upgrade your method

Implementing Tandem LC or LC-MS into your workflow is easy with compliance-ready Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software for LC or LC-MS users and Thermo Scientific™ Standard Instrument Integration (SII) for Thermo Scientific™ Xcalibur™ software for LC-MS users.

A simple dedicated instrument method wizard enables you to create new methods without the need for additional training.

Define Fluidic Configuration

Select Fluidic Configuration
Please select the capillary kit or the fluidic configuration for the instrument.

Fluidic Configuration (Capillary Kit)

Instrument Method Wizard - Tandem: Single Pump Gradient

Please enter a single pump gradient and a split point that will be used to split the gradient into an analytical and a reconditioning part.

Analytical Part Reconditioning Part

Split Point

%A %B Flow(m/min)

| No | Time | Flow (ml/min) | %B | Curve |
|----|---------|---------------|------|----------|
| 1 | 0.000 | | | Run |
| 2 | 0.000 | 0.500 | 20.0 | S |
| 3 | 5.000 | 0.500 | 60.0 | S |
| 4 | 5.100 | 0.500 | 90.0 | S |
| 5 | 7.100 | 0.500 | 90.0 | S |
| 6 | 7.200 | 0.500 | 20.0 | S |
| 7 | New Row | | | |
| 8 | 10.000 | | | Stop Run |

Split point (min)

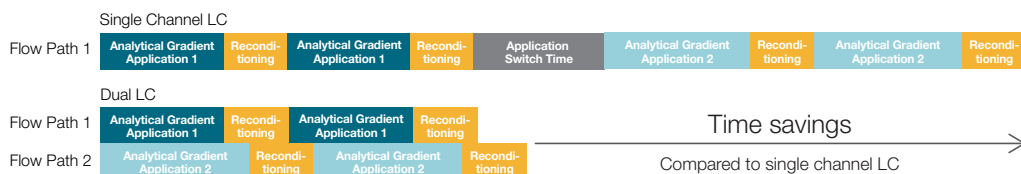
Chromeleon CDS and SII for Xcalibur guides users through the implementation of a Tandem LC or LC-MS method with automatic system volume considerations and gradient formation of the reconditioning pump.

Vanquish Duo System for Dual LC

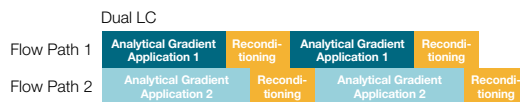
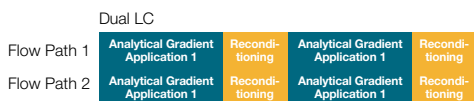
Get doubled throughput or deeper sample knowledge

Vanquish Duo for Dual LC enables you to run the same or different methods simultaneously on one instrument, doubling your throughput or deepening your sample knowledge while maximizing your productivity and performance. The unique Vanquish Duo system for Dual LC will:

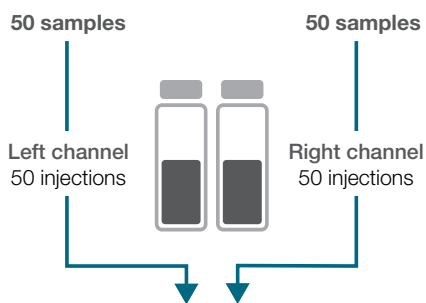
- Improve return on investment by reducing cost per sample
- Increase sample throughput without changing validated methods
- Increase capacity without sacrificing bench space
- Analyze the same set of samples with multiple methods reducing sample preparation time and maximizing sample information



What can you do with a Vanquish Duo system for Dual LC?

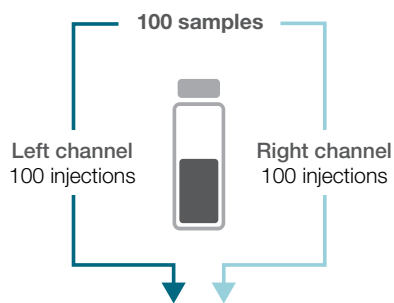


Run two identical columns in parallel



Be finished in half the time

Run your complementary columns in parallel



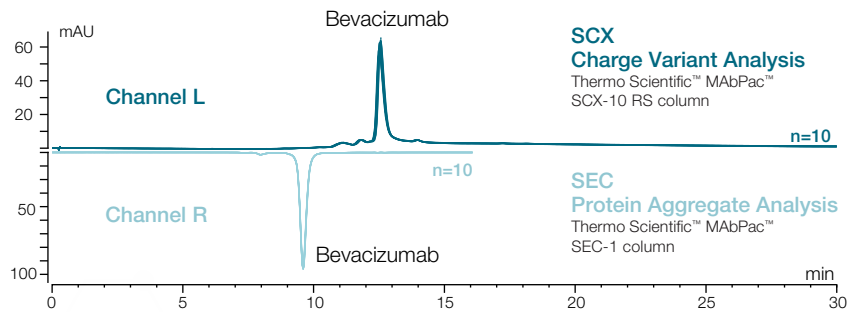
Get more information out of every sample

“The instrument offers a fantastic increase in throughput, either while running the same separation chemistry or most excitingly when running two different separation chemistries, enabling us to generate large amounts of characterization data from the same sample quickly.”

Dr. Jonathan Bones
National Institute for Bioprocessing Research and Training



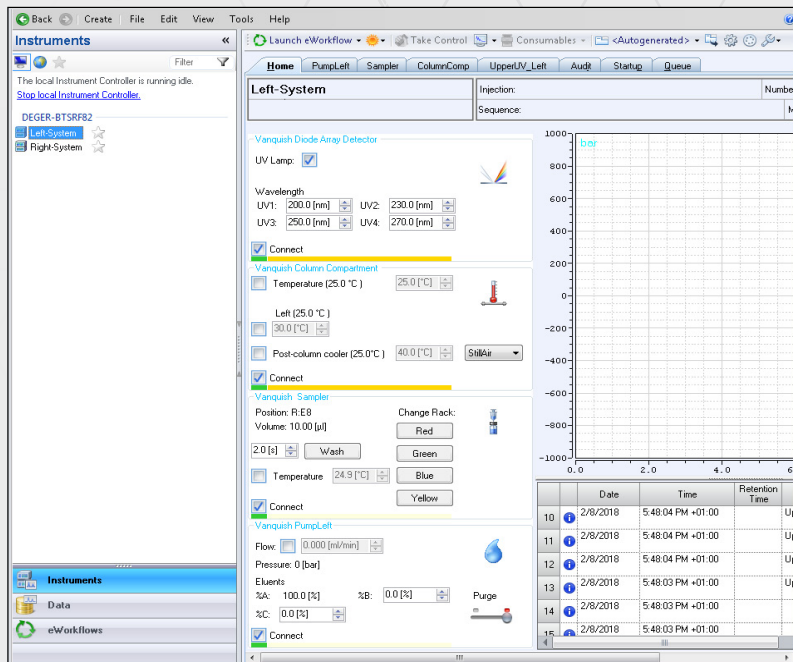
Sample injected on two complementary columns



Two independent assays run **simultaneously** from a single sample on **one** LC instrument to deepen your sample knowledge.

Complete control with just a few clicks

Chromleon CDS delivers industry-leading ease-of-use for the Vanquish Duo system for Dual LC. Independently control the two channels of the Vanquish Duo system for Dual LC from a single interface with full traceability of all actions that is 21 CRF Part 11 compliant.



Easy-to-use and intuitive system control of the Dual LC workflow within Chromleon CDS.

See the Vanquish Duo System for Dual LC

The Vanquish Duo systems have been built to utilize a wide range of analytical detectors, including mass spectrometry (MS), diode array detection (DAD), charged aerosol detection (CAD), variable wavelength detection (VWD), and fluorescence detection (FLD).

1 Versatile detection capabilities

Differing molecular characteristics of your analyte, from small molecules to complex biomolecules, necessitate multiple detector methodologies. Vanquish Duo system for Dual LC can be used with any two detectors out of the broad detector portfolio including MS, DAD, VWD, FLD and CAD.

2 Versatile column management

Greater column capacity (two 30 cm columns or a greater number of shorter columns per compartment), plus class-leading temperature range and temperature stability.

3 Delivering powerful separations

Run samples with two similar or different columns to increase throughput or maximize output. Setup with optional second compartment for independent column temperatures.

4 Easier operation

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

5 Two proprietary injection valves

Two separate injection valves with no shared fluidics allowing full application flexibility, including individual eluents, wash liquids and loop sizes.

6 Unique Thermo Scientific™ SmartInject technology

Superior retention time precision and enhanced column protection with intelligent SmartInject technology on both flow paths.

7 Easier sample handling

Automated barcode reader to eliminate tedious rack configuration.

8 Higher sample capacity

High sample capacity is standard (four plates vs. two plates on industry average). Increase capacity further with the optional Thermo Scientific™ Vanquish™ Charger module.

9 Accurate flow for more data confidence

The flow is delivered by a dual pump offering two truly individual devices in a single housing with ternary gradient proportioning.

10 Simple maintenance

Module maintenance is tool-free and can be worked on without de-stacking, plus smart light bars on the front of the system provide instant system status update.

11 Keep the lab tidy

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



The Vanquish Duo systems are designed around the column, the core to every LC separation. Our family of Thermo Scientific™ Vanquish™ UHPLC columns, partnered with the Vanquish platform ensure superb chromatographic separations. In addition, all Vanquish UHPLC valves are biocompatible, have a long-lifespan, and low maintenance, meeting the performance needs to make UHPLC run robustly and routinely.



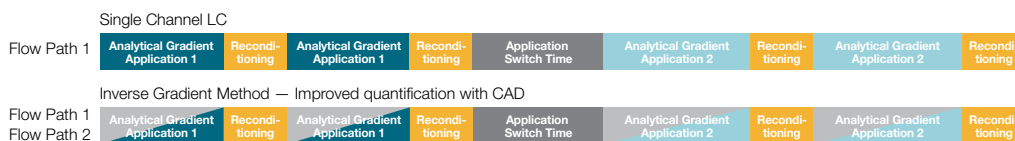
Vanquish Duo System for Inverse Gradient

Improve your quantification and see what you've been missing

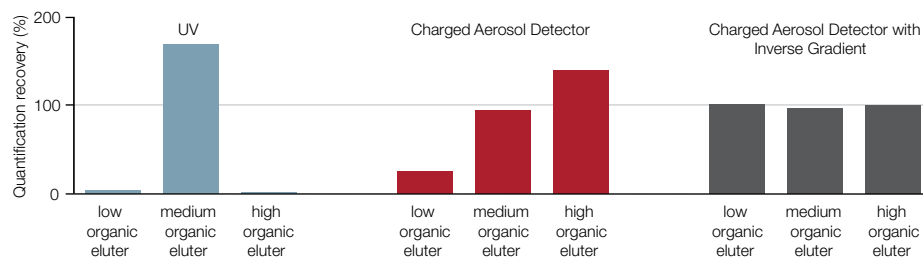
Vanquish Duo system for Inverse Gradient provides you a uniform response for all detectable analytes with the superior charged aerosol detection (CAD). While isocratic separations can yield a uniform CAD response, some separations require gradient elution. By utilizing a second pump to deliver an inverse gradient, the detector offers:

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

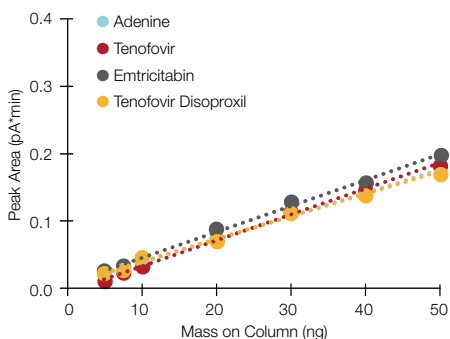
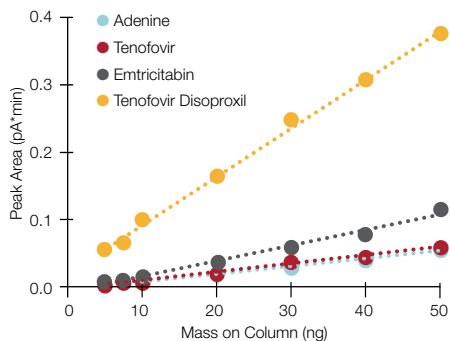
By using an Inverse Gradient for compensation, the eluent entering the detector always has the same solvent composition, no matter where the compound elutes during the gradient. This gives you **consistent response for quantitative information** with high confidence even if you lack an **individual standard** of a specific compound.



Quantification recovery of unknown compounds



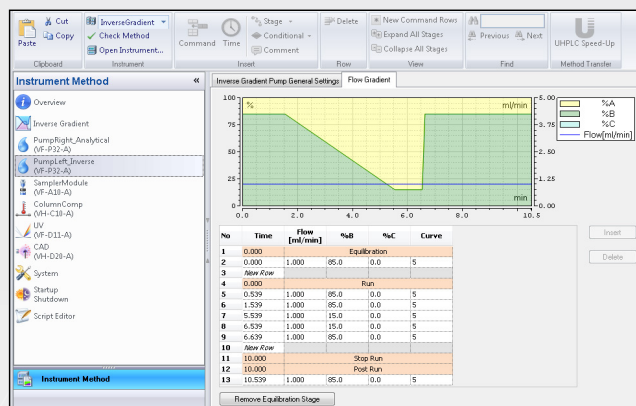
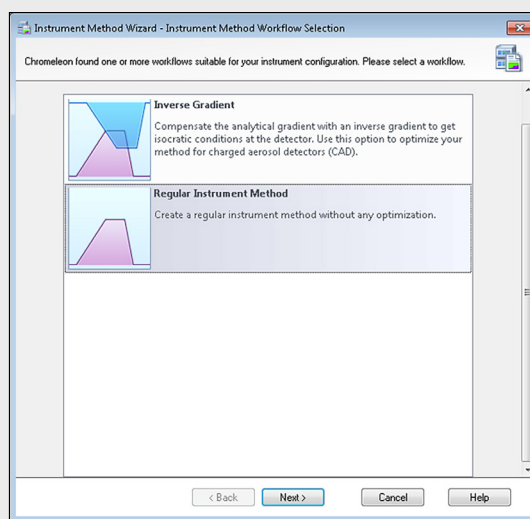
For a gradient separation, the quantification recovery of unknown compounds with CAD is best with the eluting conditions from the Inverse Gradient approach. For a standard CAD, the quantification recovery will depend on the organic content. UV detection recovery depends on chromophore extinction coefficient.



Calibration curves for four pharmaceuticals without (top) and with Inverse Gradient compensation (bottom) showing similar response factors for all compounds.

No extra work needed— automatic gradient conversion

Chromeleon CDS automatically identifies the Inverse Gradient instrument configuration and starts the dedicated method wizard. The wizard calculates and applies the Inverse Gradient to the second pump in the Vanquish Duo System for Inverse Gradient taking into account all internal volumes giving highest quantification accuracy and maximized ease-of-use.



Chromeleon CDS guides users through the implementation of an Inverse Gradient method with automatic system volume considerations and gradient formation.

See what you've been missing

Most detection options in liquid chromatography require certain physico-chemical properties to detect a substance, such as a chromophore for UV light absorption or ionizability for mass spectrometry. Charged aerosol detection detects any non-volatile analyte independent of chemical structure while simultaneously providing uniform response, excellent sensitivity and a wide linear range.

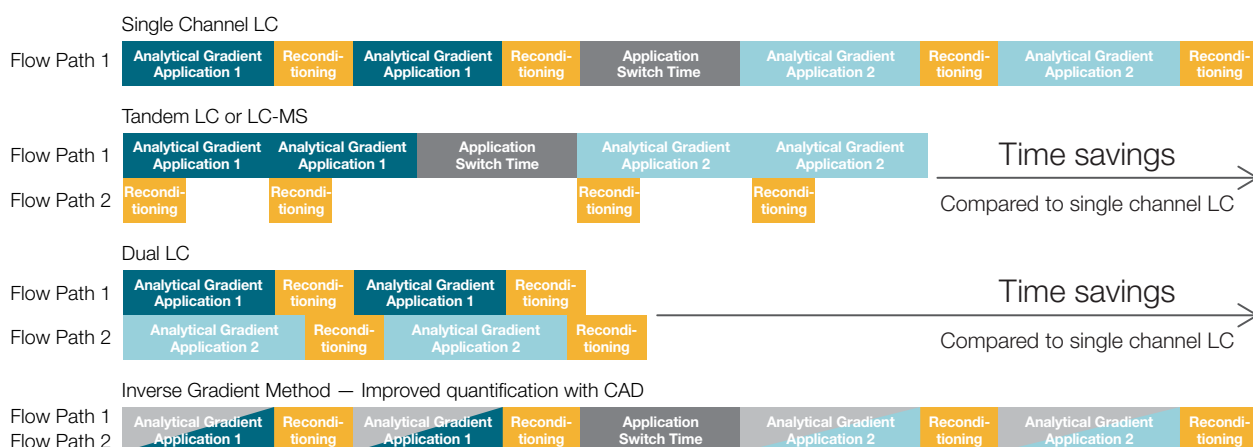


See productivity in a new light

Overview of Vanquish Duo systems

Regardless of which Vanquish Duo system is right for your lab, each system will improve your return on investment and help you to succeed with your individual goals. With our additional expertise in application, technical and lab service support we can help to accelerate your journey from sample to knowledge.

| Benefits | Vanquish Duo system for Tandem LC or LC-MS | Vanquish Duo system for Dual LC | Vanquish Duo system for Inverse Gradient |
|---|--|---|--|
| Improved return on investment | ✓ Increased detector utilization | ✓ Double throughput or increase sample knowledge | ✓ Reliable quantification |
| Saves bench space (single instrument footprint) | ✓ | ✓ | ✓ |
| Easy-to-use (built-in Chromeleon CDS wizards) | ✓ | ✓ | ✓ |
| Increased sample throughput for LC or LC-MS gradient methods | ✓ | | |
| Doubled sample throughput for any application | | ✓ | |
| Run complementary assays simultaneously | | ✓ | |
| Reliably quantify unknown compounds | | | ✓ |



Find out more at thermofisher.com/VanquishDuo

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