

# Vanquish Neo UHPLC System

## The new standard in nano-, capillary-, and micro-flow LC

### Beyond discovery

The Thermo Scientific™ Vanquish™ Neo UHPLC system is all-in-one nano-, capillary-, and micro-flow LC system that is ready for high sensitivity LC-MS workflows from discovery research with limited sample amounts to high-throughput validation in large sample cohorts.

- Thermo Scientific™ ProFlow™ XR pump technology enables robust operation up to 1500 bar with a flow range from 1 nL/min to 100 µL/min
- Active flow control for the entire flow range ensures excellent retention time precision for long gradients as well as ultra-short run times
- Vial bottom detection technology enables injections from limited sample amounts and automated multi-wash of injection fluidics reduces system carryover to negligible levels

### Beyond innovation

The Vanquish Neo UHPLC system is designed to accelerate productivity with long-term, trouble-free operation at maximum performance.

- Autosampler split-loop design with 1500 bar compatible low-dispersion maintenance-free ceramic valves, multifunctional metering device and Thermo Scientific™ nanoViper™ fittings maximizes productivity and enables robust operation without compromise
- Next generation SmartInject technology minimizes column pressure shock for direct as well as trap-and-elute injections resulting in improved retention time precision, longer column lifetime, and stable electrospray ionization response
- Fast sample loading and column equilibration modes with pump operating at constant elevated pressure reduce overhead time and boost throughput



### Beyond possibilities

The Vanquish Neo UHPLC system enables LC-MS experts and novice users to get high-quality results every time.

- Integrated system intelligence with standardized configurations for automated method setup is guiding the creation of optimal LC methods for reproducible LC-MS results
- Automatic procedures for rapid and reliable return of the system to operation after solvent exchange or system maintenance
- Thermo Scientific™ Vanquish™ User Interface with intuitive at-system control and system status monitoring enables access to guidelines, standalone diagnostics and maintenance routines

## Specifications

| Vanquish Neo UHPLC System—<br>Binary Pump N, Split Sampler NT, Solvent Rack, Vanquish User Interface (VUI), System base with drawer, Ship kit |                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Settable flow range                                                                                                                           | 1 nL/min–100 µL/min, in 1 nL increments                                                                                                                                                                                                                                                                                                                                            |
| Recommended flow-range                                                                                                                        | 100 nL/min–100 µL/min                                                                                                                                                                                                                                                                                                                                                              |
| Pressure range                                                                                                                                | 150 MPa, (1500 bar, 21,750 psi)<br><small>Note: the total available column pressure depends on the mobile phase viscosity and flow rate (see the manual)</small>                                                                                                                                                                                                                   |
| Biocompatible                                                                                                                                 | Yes                                                                                                                                                                                                                                                                                                                                                                                |
| Gradient delay volume                                                                                                                         | <ul style="list-style-type: none"> <li>• &lt;0.5 µL in nano/cap direct injection configuration with 20 µm I.D. capillaries</li> <li>• &lt;2.0 µL in micro direct injection configuration with 50 µm I.D. capillaries</li> </ul>                                                                                                                                                    |
| pH range                                                                                                                                      | 2–10                                                                                                                                                                                                                                                                                                                                                                               |
| Retention time precision                                                                                                                      | ≤0.2% RSD or ≤0.1 SD min whichever is greater for TGQAPGFSYTDANK Cytochrome C protein digest peptide based on the installation qualification procedure                                                                                                                                                                                                                             |
| Carryover (typical application)                                                                                                               | ≤0.1% for TGQAPGFSYTDANK Cytochrome C protein digest peptide using the installation qualification procedure                                                                                                                                                                                                                                                                        |
| Vanquish User Interface (Vanquish System Controller and Vanquish Display)                                                                     | <ul style="list-style-type: none"> <li>• System monitoring</li> <li>• Direct system control</li> <li>• At-system diagnostics and troubleshooting</li> <li>• Remote access option (depending on on-site IT infrastructure)</li> </ul>                                                                                                                                               |
| Pump type and operation principle                                                                                                             | <ul style="list-style-type: none"> <li>• High-pressure binary gradient pump with active flow control</li> <li>• Serial dual-piston with independent piston drives</li> </ul>                                                                                                                                                                                                       |
| Pump solvent channels                                                                                                                         | 2 (one per pump block); pre-calibrated for <ul style="list-style-type: none"> <li>• 100% acetonitrile</li> <li>• 100% water</li> <li>• 80/20 acetonitrile/water (% v/v)</li> <li>• 90/10 methanol/water (% v/v)</li> </ul> <small>Note: guided custom solvent calibration procedure is available to calibrate other solvents</small>                                               |
| Contribution of the pump to the system gradient delay volume                                                                                  | <25 nL                                                                                                                                                                                                                                                                                                                                                                             |
| Autosampler operating principle                                                                                                               | Split-loop injection                                                                                                                                                                                                                                                                                                                                                               |
| Autosampler liquids                                                                                                                           | 4 wash liquids: outer and inner needle wash, weak and strong each                                                                                                                                                                                                                                                                                                                  |
| Injection needle and fluidics wash                                                                                                            | <ul style="list-style-type: none"> <li>• Dip rinse and continuous rinse of outer needle surface with two independent wash liquids</li> <li>• Sample loop and inner needle rinse with two independent wash liquids</li> </ul>                                                                                                                                                       |
| Degassing channels                                                                                                                            | 2 built-in degassing channels for autosampler metering device wash liquids                                                                                                                                                                                                                                                                                                         |
| Vial bottom detection technology                                                                                                              | Yes, 2.5 µL out of 3 µL with vial bottom detection and recommended vials<br><small>Note: ≤0.5% RSD for injections from multiple vials</small>                                                                                                                                                                                                                                      |
| SmartInject technology                                                                                                                        | Yes, with active pressure monitoring                                                                                                                                                                                                                                                                                                                                               |
| Injection modes                                                                                                                               | <ul style="list-style-type: none"> <li>• Direct injection with loop inline</li> <li>• Direct injection with loop offline</li> <li>• Trap-and-elute injection with back-flush or forward-flush elution</li> <li>• Heated trap-and-elute injection with back-flush or forward-flush elution (Column Compartment N with one 2-position 6-port switching valve is required)</li> </ul> |
| Automation features                                                                                                                           | Barcode reading: <ul style="list-style-type: none"> <li>• Empty segment detection</li> <li>• Rack/well plate identification</li> <li>• Inventory management</li> </ul>                                                                                                                                                                                                             |

**Vanquish Neo UHPLC System—  
Binary Pump N, Split Sampler NT, Solvent Rack, Vanquish User Interface (VUI), System base with drawer, Ship kit**

|                                                    |                                                                                                                                                                                                                                                                                                                                                                                      |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Injection volume range                             | Default: 0.01–25 µL, min step 0.01 µL<br>Optional: 0.01–100 µL, min step 0.01 µL<br>High volume trapping by multiple draw-and-trap cycles up to 500 µL using 100 µL sample loop                                                                                                                                                                                                      |
| Injection volume precision                         | From 0.05 to 0.20 µL: ≤5.0% RSD<br>From 0.20 to 0.50 µL: ≤1.5% RSD<br>From 0.50 to 2.00 µL: ≤0.5% RSD<br>Above 2µL: ≤0.25% RSD                                                                                                                                                                                                                                                       |
| Injection accuracy                                 | Typically, ±0.5% for injection volume 5 µL (caffeine aqueous solution)                                                                                                                                                                                                                                                                                                               |
| Injection linearity                                | $R \geq 0.9999$                                                                                                                                                                                                                                                                                                                                                                      |
| Autosampler cooling                                | 4–40 °C, ≥23 K below ambient at <80% relative humidity                                                                                                                                                                                                                                                                                                                               |
| Sample temperature stability                       | ±1 °C                                                                                                                                                                                                                                                                                                                                                                                |
| Sample formats and capacity                        | Any four of the following <ul style="list-style-type: none"> <li>• 54 × 12 mm OD vials (≤1.5 mL)</li> <li>• 96 × 6, 7, and 8 mm OD vials (≤1.2 mL)</li> <li>• 16 × 15 mm OD vials (≤4 mL)</li> <li>• 9 × 22.5 mm OD vials (≤10 mL)</li> <li>• Well plates (96 and 384, deep and shallow, with SBS footprint)</li> </ul> + capacity of 12 × 22.5 mm OD vials (≤10 mL) in the carousel |
| Safety features                                    | Leak detection and safe leak handling; excess pressure monitoring; temperature monitoring                                                                                                                                                                                                                                                                                            |
| System interlink                                   | 4 × system interlink connectors (2 pairs, RJ45-8)                                                                                                                                                                                                                                                                                                                                    |
| PC connection                                      | USB 2.0<br>3-port-HUB to connect further Vanquish modules<br>LAN                                                                                                                                                                                                                                                                                                                     |
| I/O interfaces                                     | 2 × USB 2.0 (Host)<br>1 × LAN<br>2 × 6 pin Mini-Din connectors each having functionality: 1 input, 1 relay out                                                                                                                                                                                                                                                                       |
| GLP features                                       | <ul style="list-style-type: none"> <li>• System wellness monitoring</li> <li>• Predictive performance functions for scheduling maintenance procedures based on the actual operating and usage conditions</li> <li>• System parameters logged in the Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) audit trail</li> </ul>                                           |
| Environmental conditions                           | 5 °C – 35 °C<br>20–80% relative humidity (non-condensing)<br>Max. altitude 2000 m above sea-level                                                                                                                                                                                                                                                                                    |
| Power requirements                                 | Binary Pump N: 100–240 V AC, ±10%; 50/60 Hz; max. 525 W / 550 VA<br>Split Sampler NT: 100–240 V AC, ±10%; 50/60 Hz; max. 525 W / 550 VA<br>VUI: 100–240 V AC ± 0%; 50/60 Hz; max. 50 W / 150 VA                                                                                                                                                                                      |
| Dimensions (h × w × d)                             | 740 mm × 450 mm × 650 mm (29.1 in. × 17.7 in. × 25.6 in.)<br>(Vanquish Display is positioned in front of the solvent rack)                                                                                                                                                                                                                                                           |
| Weight                                             | 66 kg (29.9 lbs)                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Software control</b>                            |                                                                                                                                                                                                                                                                                                                                                                                      |
| Vanquish Neo stand-alone (no MS detector)          | Chromeleon CDS Version 7.2.10 MUd                                                                                                                                                                                                                                                                                                                                                    |
| Vanquish Neo with Thermo Scientific MS instruments | Chromeleon CDS Version 7.2.10 MUd with MS instruments supported by Chromeleon CDS Thermo Scientific™ Standard Instrument Integration (SII) for Xcalibur (version 1.5.1)                                                                                                                                                                                                              |

## Optional modules

### Column Compartment N

|                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermostating principle            | Forced air mode, no cooling                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Orientation                        | Horizontal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Temperature range                  | Min: 5 K above room temperature<br>Max: 80 °C without valves installed<br>Max: 60 °C with Vanquish valves installed                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Temperature precision              | ±0.1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Temperature accuracy               | ±0.5 K (at 50 °C setpoint)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Heat-up time                       | Less than 12 min from 35 °C to 65 °C ±1 K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Column compatibility               | <ul style="list-style-type: none"><li>• Coiled fused silica columns</li><li>• Linear columns with maximum available length for column plus fittings: 300 mm</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                |
| Compartment dimensions (h × w × d) | 343 mm × 78 mm × 37 mm (13.5 in. × 3.1 in. × 1.5 in.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Switching valves                   | Optional, inside the column compartment, grounded<br>Mixed configurations with compatible Vanquish and VICI® valves are possible<br>VICI valve drive has to be removed/installed by a certified engineer<br>Up to 2 valves <ul style="list-style-type: none"><li>• Vanquish valves<ul style="list-style-type: none"><li>– 2-position 6-port Vanquish low-dispersion (LD) 1500 bar valve</li></ul></li><li>• VICI valves:<ul style="list-style-type: none"><li>– 2-position 6-port C82 1034 bar valve</li><li>– 2-position 6-port C82 1/32 VICI C2N 344 bar valve</li></ul></li></ul> |
| Passive pre-heater                 | Installable, optional accessory<br>0.1 mm I.D. × 530 mm, MP35N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Biocompatible                      | Yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| System interlink                   | 2 system interlink connectors (RJ45-8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| PC connection                      | USB 2.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| GLP features                       | Predictive performance functions for scheduling maintenance procedures based on the actual operating and usage conditions of the column compartment<br>All system parameters are logged in the Chromeleon CDS audit trail                                                                                                                                                                                                                                                                                                                                                            |
| Environmental operating conditions | 5 °C – 35 °C<br>20–80% relative humidity (non-condensing)<br>Max. altitude 2000 m above sea-level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Power requirements                 | 100–240 V AC, ±10%; 50/60 Hz; max. 525 W / 550 VA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Outer dimensions (h × w × d)       | 159 mm × 420 mm × 620 mm (6.3 in. × 16.5 in. × 24.4 in.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Weight                             | 11 kg (24.3 lbs) (without switching valves)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Binary Pump N

|                                                              |                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pump type and operation principle                            | High-pressure binary gradient pump with active flow-control<br>Serial dual-piston with independent piston drives                                                                                                                                                                                                                      |
| Settable flow range                                          | 1 nL/min–100 µL/min, in 1 nL increments                                                                                                                                                                                                                                                                                               |
| Recommended flow-range                                       | 100 nL/min–100 µL/min                                                                                                                                                                                                                                                                                                                 |
| Pressure range                                               | 150 MPa, (1500 bar, 21,750 psi)<br><small>Note: the total available column pressure depends on the mobile phase viscosity and flow rate (see the manual)</small>                                                                                                                                                                      |
| Pump solvent channels                                        | 2 (one per pump block); pre-calibrated for <ul style="list-style-type: none"> <li>• 100% acetonitrile</li> <li>• 100% water</li> <li>• 80/20 acetonitrile/water (% v/v)</li> <li>• 90/10 methanol/water (% v/v)</li> </ul> <small>Note: guided custom solvent calibration procedure are available to calibrate other solvents</small> |
| Contribution of the pump to the system gradient delay volume | <25 nL                                                                                                                                                                                                                                                                                                                                |
| Biocompatible                                                | Yes                                                                                                                                                                                                                                                                                                                                   |
| Safety features                                              | Leak detection and safe leak handling; excess pressure monitoring                                                                                                                                                                                                                                                                     |
| System interlink                                             | 2 system interlink connectors (RJ45-8)                                                                                                                                                                                                                                                                                                |
| PC connection                                                | USB 2.0<br>3-port-HUB to connect further Vanquish modules                                                                                                                                                                                                                                                                             |
| I/O interfaces                                               | 2 × 6 pin Mini-DIN connectors each having functionality: 1 input, 1 relay out                                                                                                                                                                                                                                                         |
| GLP features                                                 | Predictive performance functions for scheduling maintenance procedures based on the actual operating and usage conditions of the column compartment<br>All system parameters are logged in the Chromeleon CDS audit trail                                                                                                             |
| Environmental operating conditions                           | 5–35 °C<br>20–80% relative humidity (non-condensing)<br>Max. altitude 2000 m above sea-level                                                                                                                                                                                                                                          |
| Power requirements                                           | 100–240 V AC, ±10%; 50/60 Hz; max. 525 W / 550 VA                                                                                                                                                                                                                                                                                     |
| Dimensions (h × w × d)                                       | 192 mm × 420 mm × 620 mm (7.6 in. × 16.5 in. × 24.4 in.)                                                                                                                                                                                                                                                                              |
| Weight                                                       | 26 kg (57.3 lbs)                                                                                                                                                                                                                                                                                                                      |



Vanquish Neo UHPLC system



Vanquish Neo UHPLC system with  
Column Compartment N

## Ordering information

| Description                                        | Part Number                                                                                                                                                                                                |
|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>System</b>                                      |                                                                                                                                                                                                            |
| Vanquish Neo UHPLC System                          | VN-S10-A-01 and 6036.1180 Vanquish Display (required)                                                                                                                                                      |
|                                                    | Includes:<br>Binary Pump N, Split Sampler NT, Solvent Rack, Vanquish User Interface (VUI), System base with drawer, Ship kit                                                                               |
|                                                    | The Ship kit includes all items required for following workflows:<br>Direct injection<br>Trap-and-elute (2-column setup)<br>Heated trap-and-elute (requires Column Compartment N and 1 × 2pos-6port valve) |
| <b>Optional modules</b>                            |                                                                                                                                                                                                            |
| Column Compartment N                               | VN-C10-A-01                                                                                                                                                                                                |
| Binary Pump N                                      | VN-P10-A-01                                                                                                                                                                                                |
| <b>Accessories</b>                                 |                                                                                                                                                                                                            |
| Valve drive VICI, VN-C*                            | 6253.1640                                                                                                                                                                                                  |
| Vanquish Low-Dispersion valve 2pos-6port, 1500 bar | 6250.1520                                                                                                                                                                                                  |
| VICI valve 2pos-6port, 1034 bar*                   | 6041.0001B                                                                                                                                                                                                 |
| VICI valve 2pos-6port, 1/32 low pressure, PAEK*    | 6820.6232                                                                                                                                                                                                  |
| VICI Valve Lock Ring, VN-C                         | 6253.1651                                                                                                                                                                                                  |
| Sample Loop, 25 µL                                 | 6252.1940                                                                                                                                                                                                  |
| Sample Loop, 100 µL                                | 6252.1950                                                                                                                                                                                                  |
| Sample Loop, 10 µL                                 | 6252.1960                                                                                                                                                                                                  |
| IonBench with Stack Mounting Kit                   | 6036.1720                                                                                                                                                                                                  |
| Stack Stabilizer Kit                               | 6036.1710                                                                                                                                                                                                  |
| Passive pre-heater, 0.1 × 530 mm, MP35N, VH/VN-C   | 6732.0174                                                                                                                                                                                                  |

\*VICI valve drive has to be removed/installed by a certified engineer

 Learn more at [thermofisher.com/vanquishneo](https://thermofisher.com/vanquishneo)

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