Thermo Scientific Dionex UltiMate 3000 RSLCnano System

Splitless nano,
capillary, and micro UHPLC
The versatile front-end for MS

Throughput • Resolution • Sensitivity

Thermo
SCIENTIFIC

Separation power
sensitivity of nano LC

The UltiMate™ 3000 RSLCnano System–a new dimension in nano LC

The Thermo Scientific Dionex™ UltiMate 3000 RSLCnano system was developed with throughput in mind. The robust, continuous direct flow delivery is designed for interruption-free analysis. The wide flow-pressure footprint enables the application of UHPLC to the nano scale, allowing you to tune for the highest resolution or the fastest analysis time. The dual gradient availability and operation at nano, capillary, and micro flow rates provide the largest application flexibility. Configurable for speed, separation power, or sensitivity, the UltiMate 3000 RSLCnano is the only system to deliver all.

Application Range for the UltiMate 3000 RSLCnano System			
	Nano	**Capillary**	**Micro**
Flow	20–1000 nL/min	1–10 µL/min	10–50 µL/min
Max Pressure	800 bar	800 bar	800 bar
Column i.d.	25–150 µm	150–500 µm	500–1000 µm
Relative Gain in Sensitivity*	4000	250	30
Benefits	Sensitivity	Loadability	Speed
Typical Application Area	Discovery proteomics	Validation proteomics, bioanalysis	Metabolomics and biopharmaceutical analysis

*Relative sensitivity gain for average column i.d. compared to conventional LC, 4.6 mm i.d. column.

Pump Power to Drive Any Separation

- Column pressure up to 800 bar
- Continuous direct flow delivery
- Widest nano/cap/micro flow rate from 20 nL/min up to 50 µL/min
- Loading pump provides flows from 10 µL/min to 2.5 mL/min
- Fully biocompatible fluidic system

Optimized fluidics for all workflows

- Maximizes ease-of-use for peace of mind
- Reliable and robust connections
- NC pump gradient delay volume of only 25 nL
- Integrated low-dead volume switching valves
- Column heating up to 75 °C
- Snap-in valves

Advanced automation and detection technology

- Automated sample fractionation and reinjection
- Zero-sample-loss injections
- Sample derivatization
- Extensive wash routines to minimize carryover

UltiMate 3000 RSLCnano System benefits

- Up to 3 times faster than conventional nano systems

- Up to twice the resolution of traditional nano systems

- Extensive flow-pressure footprint for maximum application flexibility

- Fingertight Thermo Scientific Dionex nanoViper™ fittings for easy, connections

- Continuous direct flow delivery for excellent ease-of-use

- Complete MS integration with Thermo Scientific Dionex DCMS^Link™ software

- Full range of consumables for all application areas

Consumables for all separation needs

- High-resolution peptide mapping

- Monoliths for protein separations

- Wide range of sizes and chemistries
  - Reversed Phase (RP)
  - Ion Exchange (IEX)
  - Mixed Mode (RP, IEX, HILIC)

Intelligent Software

- DCMS^LINK for single point LC-MS control

- eWorkflows for simplified operation

- Thermo Scientific Dionex Chromeleon™ software panels for intuitive instrument control

- System diagnostics for wellness monitoring and improved uptime
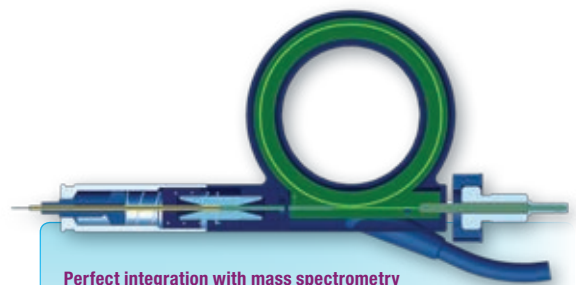
Perfect integration with mass spectrometry

- Orbitrap technology

- Thermo Scientific EASY-Spray™ integrated column and spray needle

- No longer compromising ease of use over performance

- Phosphopeptides analysis

- 2D-LC applications

3

Pump power
to drive any separation

Taking advantage of the flow-pressure footprint

The wide flow-pressure footprint of the UltiMate 3000 RSLCnano system supports nano, capillary, and micro applications with pump power up to 800 bar. The built-in micro pump can deliver ternary gradients at micro and analytical flow rates for precon-centration or 2D applications. This unique combination allows for high resolution, high speed, and high sensitivity in many different application areas, making the UltiMate 3000 RSLCnano system the most flexible system available.
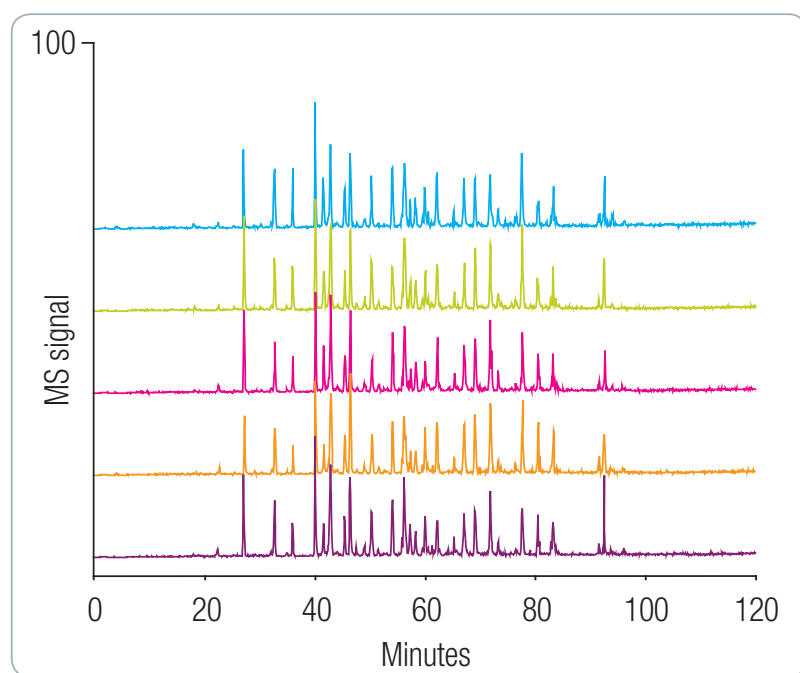

Pump at 300 nL/min with exceptional gradient reproducibility.
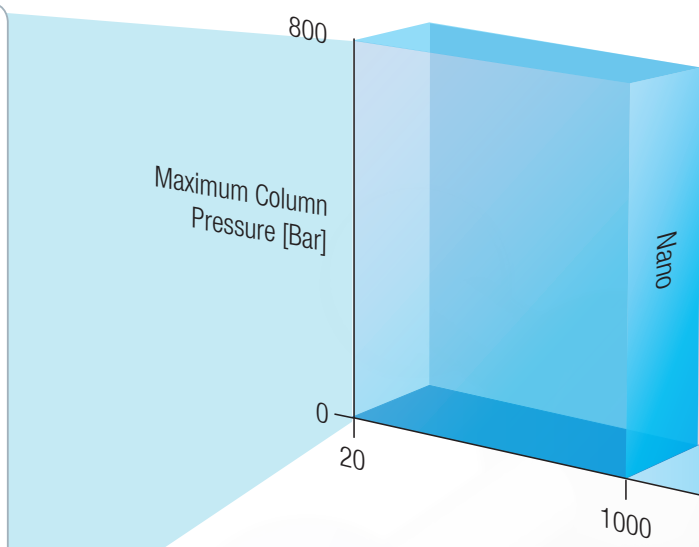
The UltiMate 3000 RSLCnano system provides the most extensive flow-pressure footprint for nano, capillary, and micro applications. This offers analytical laboratories unprecedented flexibility in a single system.

Peak capacity~900
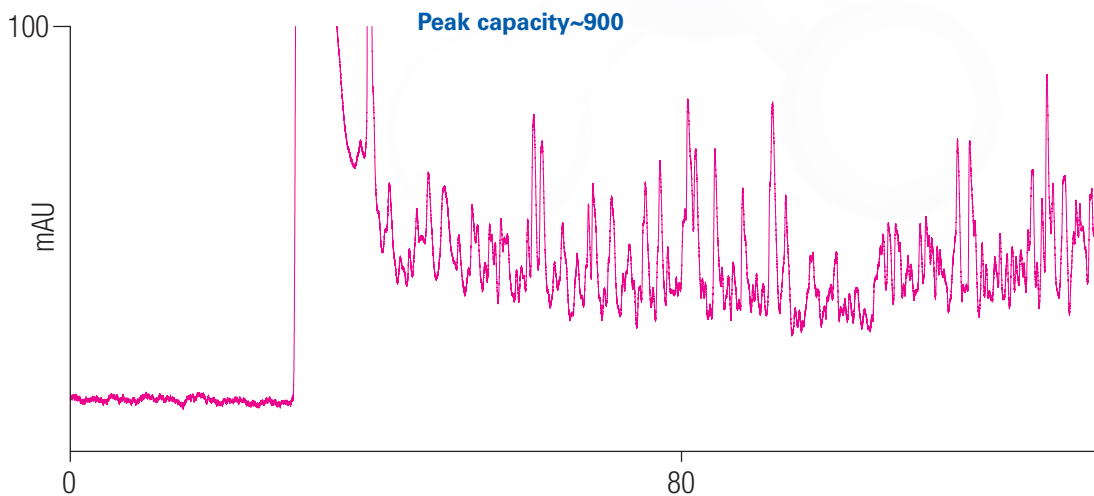
Combine four 25 cm columns for a 1 m column separation at 800 bar to obtain the highest possible resolution.

Cap

Micro

nL/min

10000

50000

Micro

Cap

Nano

200

MS signal

0   0.5   1.0
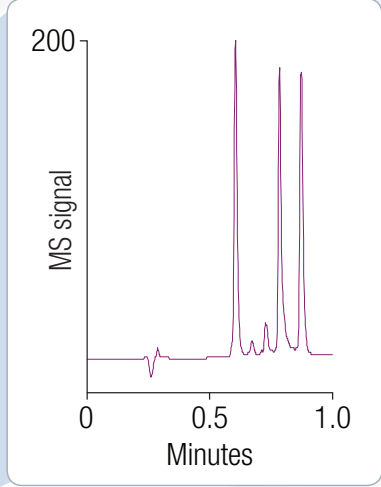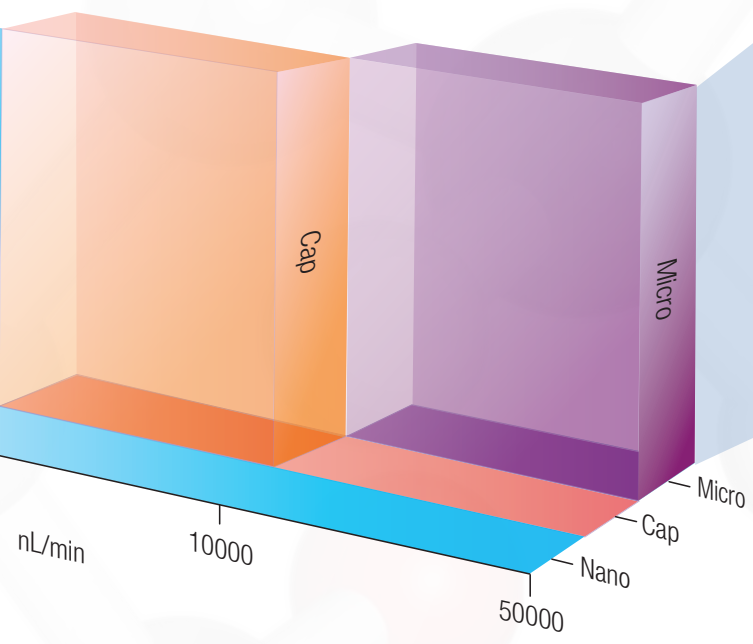
Minutes

Perform ultrafast microflow separations to separate proteins in less than one minute with peak widths at half height of 1 s.

160

Minutes

240

315
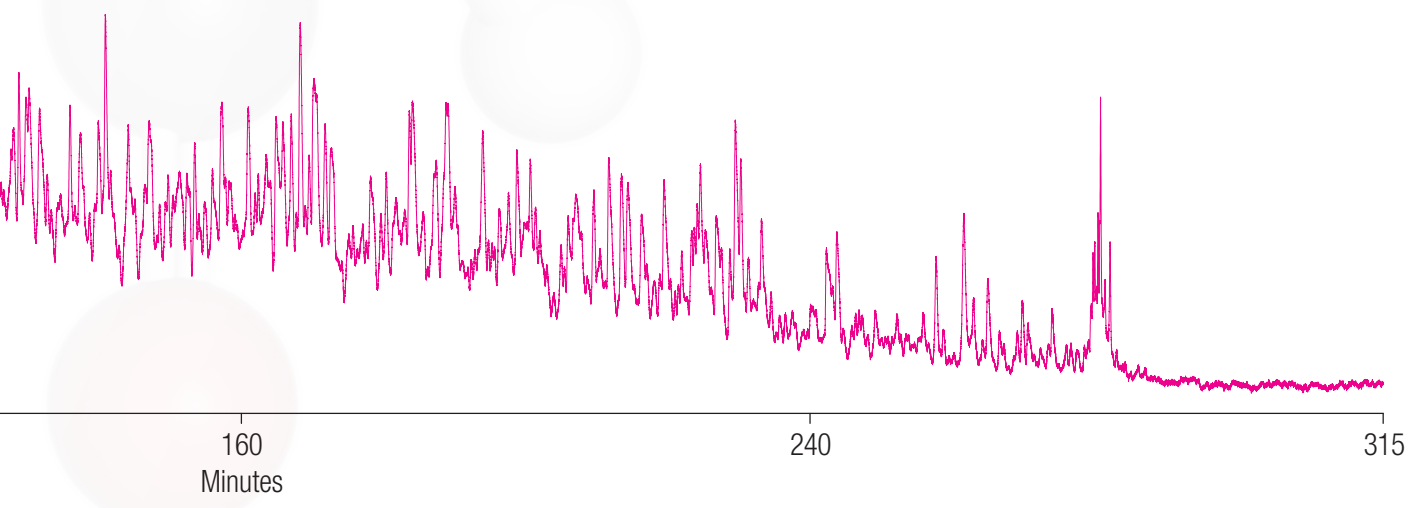
Optimized fluidics
## for all workflows

Application flexibility

There are many levels of sample complexity, each requiring a different analytical workflow. The UltiMate 3000 RSLCnano system has been specifically designed to support these workflows with maximum ease-of-use.

The unique nanoViper fitting system reduces plumbing complexity, brings unparalleled simplicity, and provides zero-dead volume connections. The nanoViper fittings and the snap-in switching valves simplify all fluidic setups, including preconcentration,

MudPIT, and advanced 2D-LC. The Thermo Scientific Dionex NCP-3200 RS pump module is perfect for nano, capillary, or micro flow delivery in direct sample loading workflows or as an additional nano pump supporting advanced 2D methods.

The nanoViper fitting system provides fingertight, zero-dead volume connections for any column, at any flow rate, for any valve, and any pressure up to 800 bar. Its elegant design ensures easy connection of all fluidics for every operator experience level.
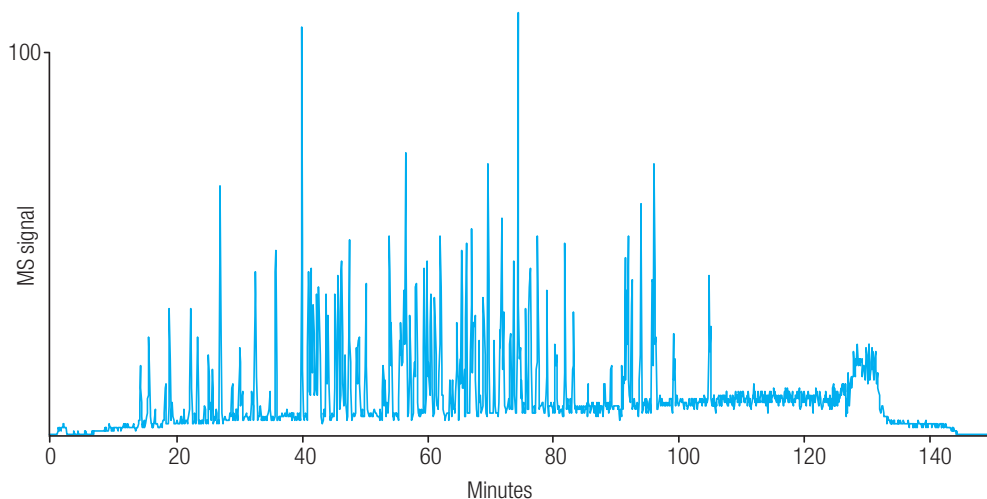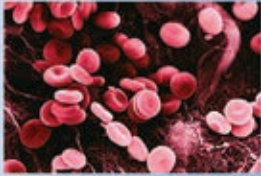
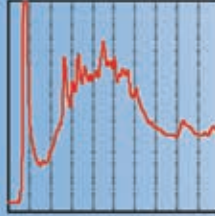Base-peak chromatogram of a complex tryptic peptide sample.
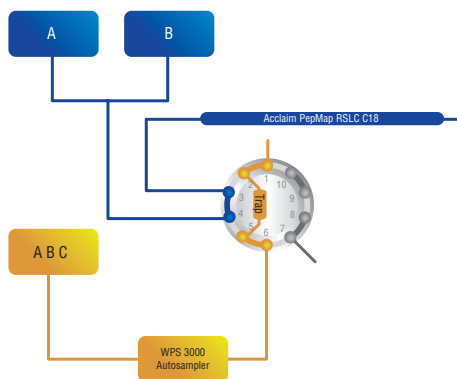
Configuration for sample preconcentration and on-line desalting. This setup fully exploits the combination of the dual pump design, heated column compartment, and switching valve all integrated in one module.

Valves can be moved forward for maximum ease-of-use when making fluidic connections.
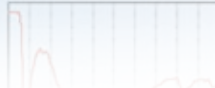
Sample protein extraction

Separate proteins 1D

Fractionate protein sample

Separate proteins 2D

In-well digestion

Separate peptides LC-MS/MS
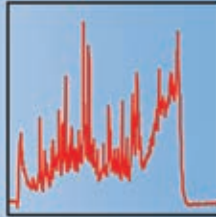
Database search, protein ID

Advanced automation
and detection technology

Precision and Sensitivity

The UltiMate 3000 RSLCnano system includes a powerful well plate autosampler. The unique dual-injection needle design and customizable programs ensure maximum flexibility and operational performance. Dedicated injection routines and tray cooling are available for zero sample loss and preservation of precious biological samples. The efficient wash routines prevent sample carryover and avoid the generation of redundant data. The instrument also offers sample derivitization (e.g., tryptic digests) and microfractionation capabilities.

UV detection can offer advantages in nano LC-MS as a diagnostic tool and can be used as a quantitative detector in capillary and micro LC applications. Regardless of the purpose, our dedicated flowcells for nano, capillary and micro LC will ensure excellent results, without compromising on separation performance.
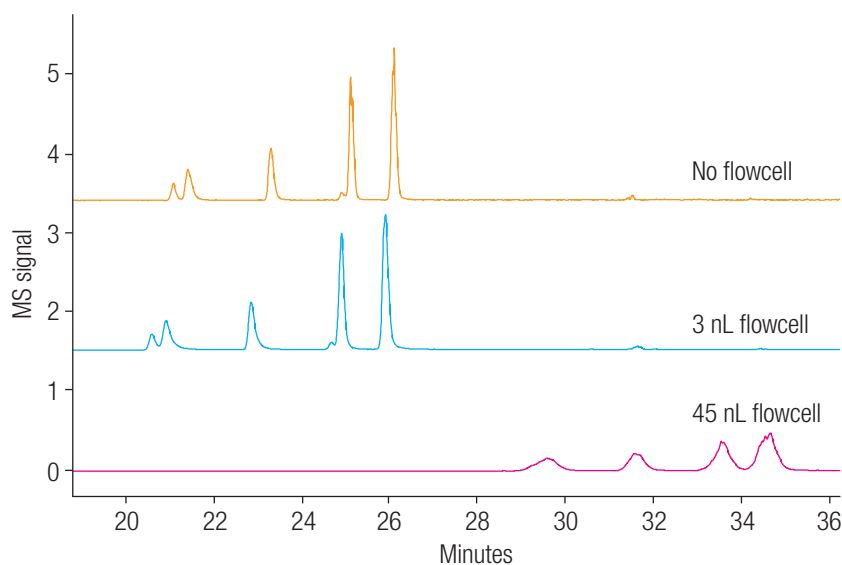
No effect on resolution and MS performance is demonstrated when using a dedicated nano (3 nL) flow cell.


The Thermo Scientific Dionex VWD-3400RS UV detector with dedicated flow cells for nano and capillary LC.

The Thermo Scientific Dionex WPS-3000PLRS nano LC autosampler with 1000 bar-rated injection valve.

Consumables
for all separation needs

Nano LC connections that never fail is exactly what nanoViper offers; and that brings a peace of mind appreciated by novice, as well as the most experienced users. nanoViper fittings are fingertight, UHPLC compatible, and universally applicable to most common hardware. These fittings come assembled on connection tubings, as well as on our wide range of separation columns. Our separation columns are available in multiple chemistries and formats up to 50 cm in length. The combination of a long history in supplying world-class columns for biomolecule separations, with nanoViper's ease of use in daily operation, enables excellent results no matter what your workflow.
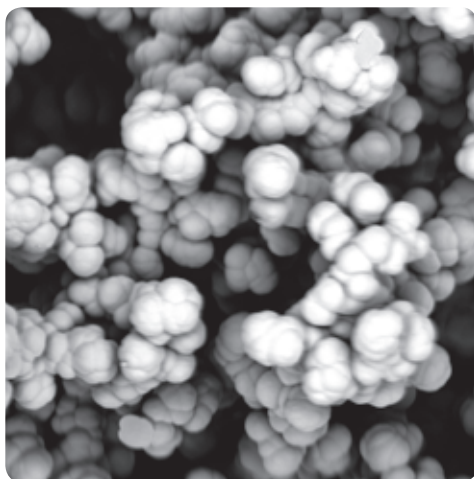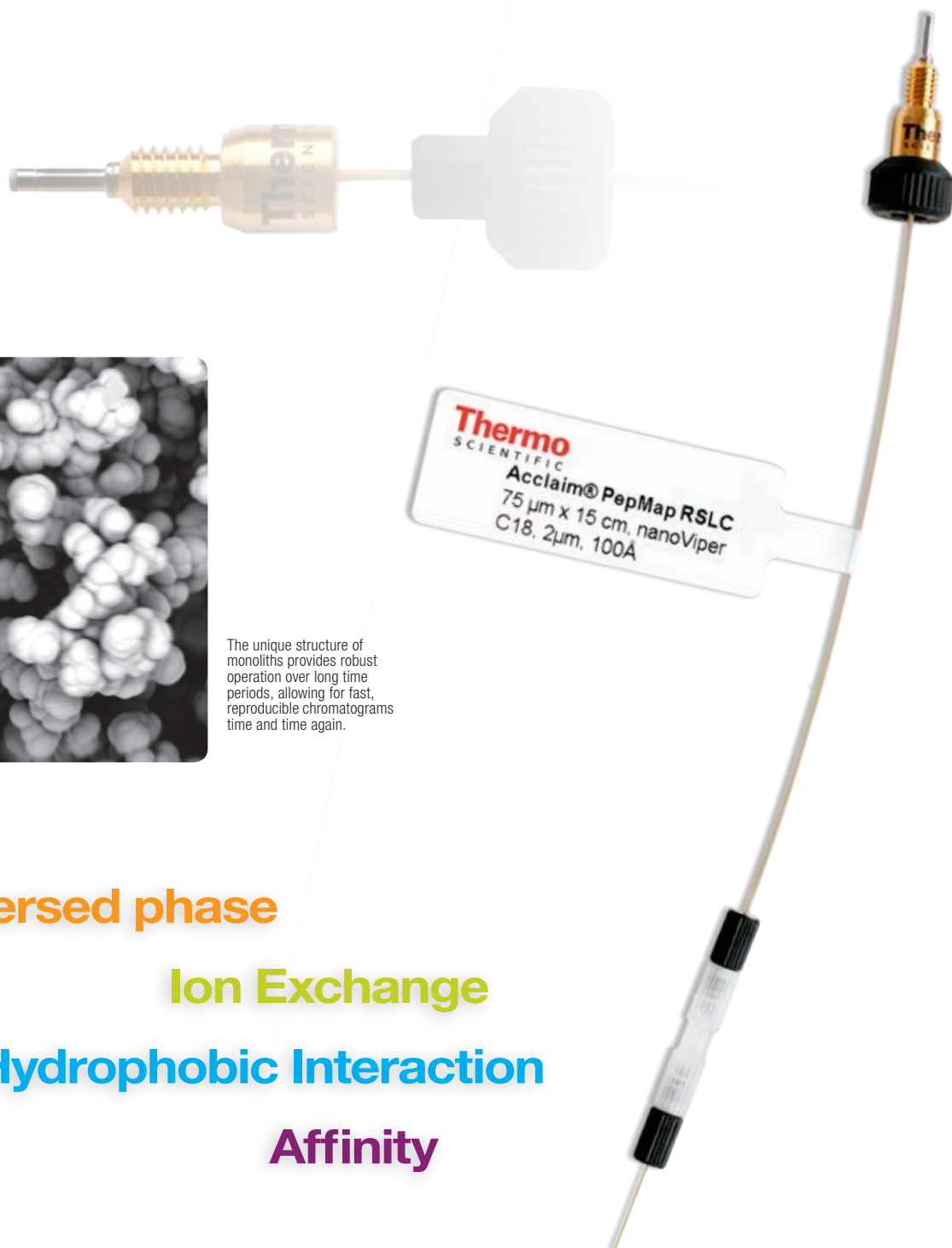
The unique structure of monoliths provides robust operation over long time periods, allowing for fast, reproducible chromatograms time and time again.

Reversed phase

Ion Exchange

**Hydrophobic Interaction**

Affinity

Intelligent
software

Powerful Software Solutions

The Chromeleon Chromatography Data System delivers intelligent functionality to streamline laboratory workflows. The thoughtfully designed user interface guides you effectively towards your goal and features a set of diagnostic functions that allows for optimal system usage.
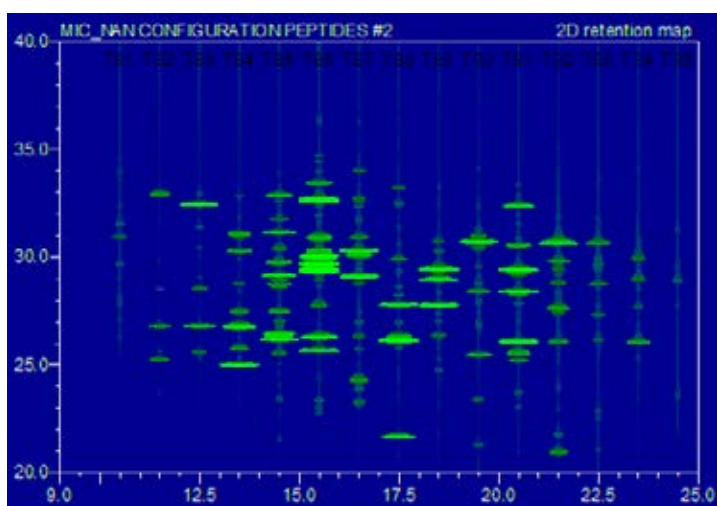

Discover more with 2D retention plots.
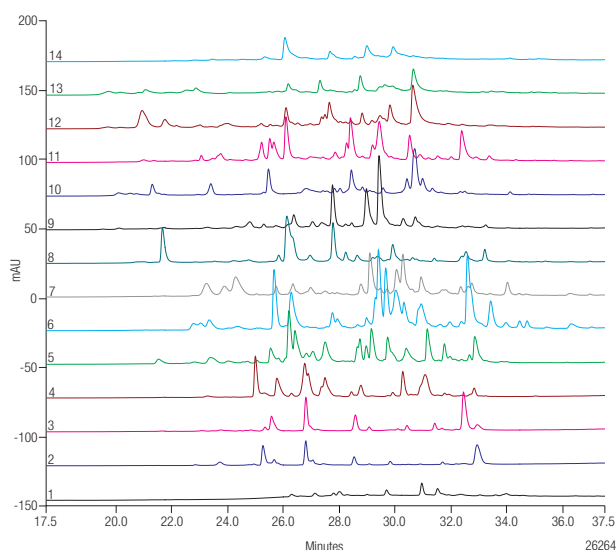
Overlay of a series of 2D separations.
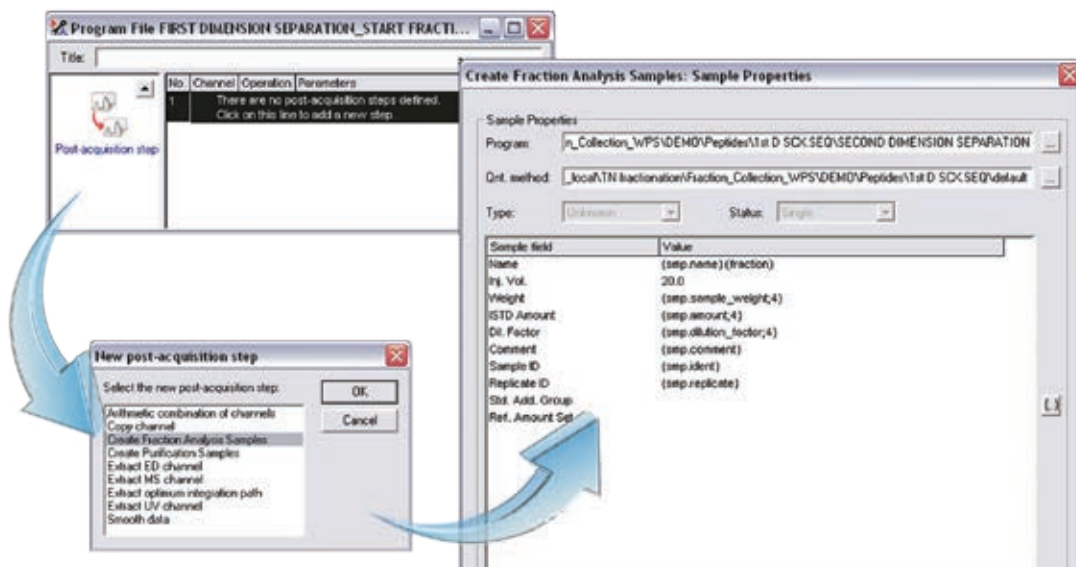
Chromeleon software's post-acquisition steps allow automation of multidimensional LC experiments.

Perfect integration
with mass spectrometry

Thermo Scientific Orbitrap™ technology has now achieved gold-standard status in the world of mass spectrometry. Understandably, the core of our LC-MS solutions is based on Orbitrap technology. The high-field Orbitrap in the Thermo Scientific Orbitrap Elite™ increases speed and sensitivity, while the Thermo Scientific Velos Pro™ dual-pressure linear ion trap offers robustness and a larger dynamic range for the ultimate analytical instrument. Multiple fragmentation modes (CID, HCD, and ETD) can be applied for the elucidation of even the most complex analyte structures.
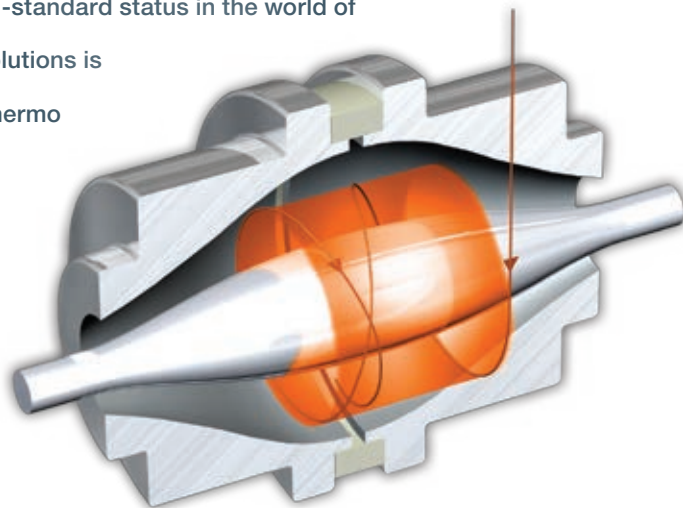
Orbitrap LC/MS technology is also extremely versatile. The Thermo Scientific Q-Exactive™ combines the Orbitrap with a quadrupole mass analyzer to combine speed with resolution and start a new field called Quanfirmatics. With Orbitrap at its center, the product range is complete with the Thermo Scientific Velos Pro Ion Trap and the TSQ Vantage™ triple stage quadrupole mass spectrometers, as well as the Thermo Scientific EASY-Spray and the Nanospray Flex ion sources.

Thermo Scientific Q Exactive mass spectrometer

Thermo Scientific TSQ triple quadrupole mass spectrometer

Thermo Scientific Velos Pro Ion Trap mass spectrometer

Thermo Scientific Orbitrap Elite mass spectrometer

Thermo Scientific Nanospray Flex Ion Source

Thermo Scientific EASY-Spray source with EASY-Spray integrated column-emitter

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Australia +61 3 9757 4486	**China** +852 2428 3282	**Ireland** +353 1 644 0064	**Sweden** +46 8 473 3380
Austria +43 1 616 51 25	**Denmark** +45 36 36 90 90	**Italy** +39 02 51 62 1267	**Switzerland** +41 62 205 9966
Benelux +31 20 683 9768	**France** +33 1 39 30 01 10	**Japan** +81 6 6885 1213	**Taiwan** +886 2 8751 6655
+32 3 353 42 94	**Germany** +49 6126 991 0	**Korea** +82 2 3420 8600	**UK** +44 1276 691722
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