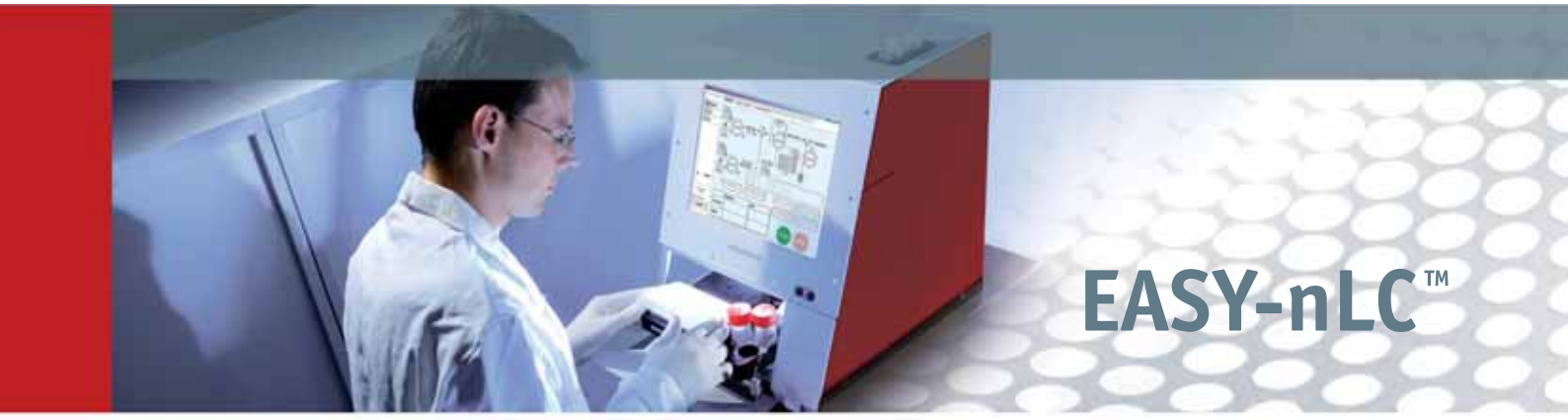


EASY-nLC™

PROXEON

Effortless, split-free nano-LC

for top performance in LC-MS

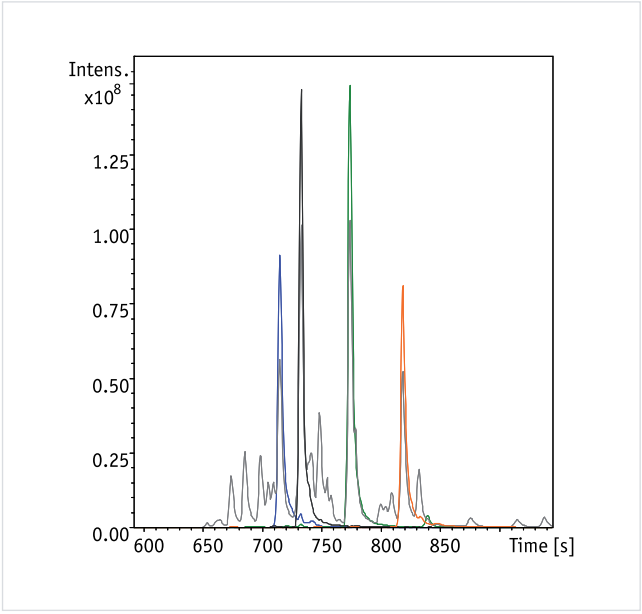
- Achieve the most precise, accurate and reproducible split-free, nanoscale LC - easily

Proven, split-free, nano-flow performance

Excellent high resolution results – every time

- Accurate label-free quantification ensured by minimal RSD values for retention times
- Stable, pulsation-free gradients from 100 nL/min
- Advanced Flow Control™ with two flow sensors prior to mixing
- Split-free gradient mixing – no flow splitting

Fast separations with typical peak widths: 3 - 5 sec (FWHM)

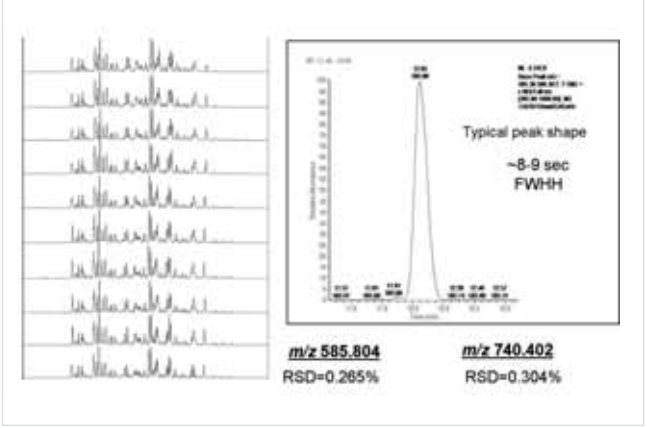


With Bruker Daltonik HCTultra

Pre-column:	**1 cm, 100 µm ID, C_{18}, 5 µm**
Analytical column:	**150 mm, 75 µm ID, C_{18}, 100 Å, 3 µm**
Sample:	**100 fmol tryptic digest of BSA**
Solvents:	**A: 0.4% acetic acid, water B: 0.4% acetic acid, acetonitrile**
Gradient:	**300 nl/min, 5 - 35 %B in 10 minutes**

Courtesy of Bruker Daltonik, Germany

Low retention time RSD values for complex mixtures



With Thermo Fisher LTQ Orbitrap XL

FT scan 390-1500 m/z

Column: 15 cm, 75 µm ID, C_{18} 5 µm

Sample: 100 fmol annexin V
800 fmol gelsolin
300 fmol BSA digestion mixture

Gradient: 300 nl/min, 3 - 35 %B in 25 minutes

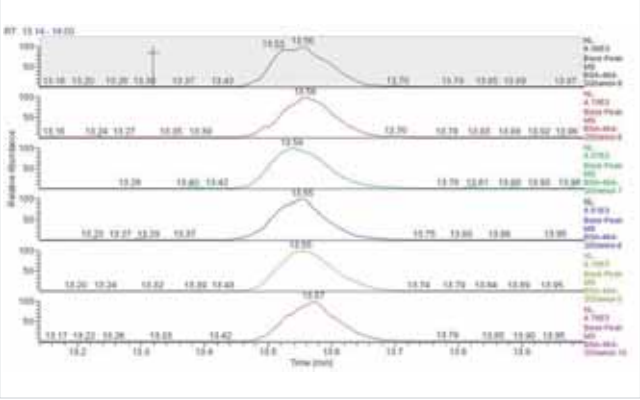
Courtesy of J.M. Asara, Beth Israel Deaconess Medical Center, Boston, MA.

Superior sample handling

Precise pick-up and low carry-over with integrated autosampler

- Efficient Peltier-controlled sample cooling
- Injection volume selectable in 0.01 µl steps
- Injection needle washed outside and inside
- Custom wash with 2 extra solvent bottles

Excellent sensitivity and reproducibility



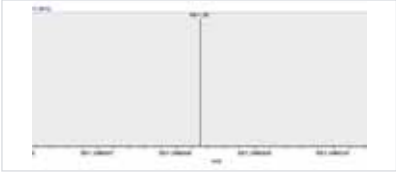
With Thermo Fisher TSQ- Quantum Ultra

MRM scan (m/z 651.3) 200 attomole BSA

Injected sample: 2µl of 100 amol/µl BSA tryptic digest.

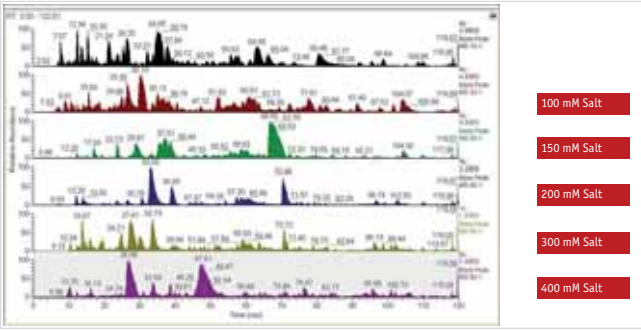
RT RSD 0.08%

Courtesy of Dr.P. Taylor, Hospital for Sick Children, Ontario.



Excellent mass accuracy

Automated 2D (SCX-RPC) separation with a 1-column system configuration



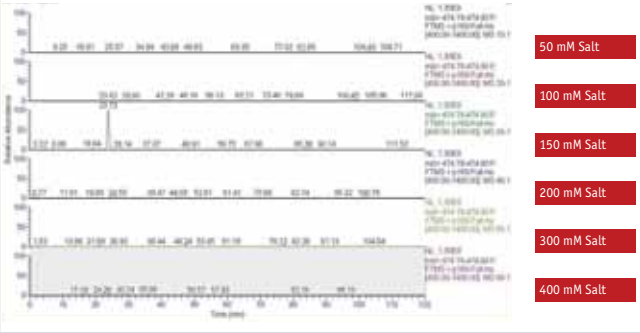
Base peak chromatograms

With Thermo Fisher LTQ Orbitrap XL

Autosampler within EASY-nLC used for precise step elution in SCX prior to RPC gradient elution and MS-MS analysis.

Separation: One-column set up of EASY-nLC with a biphasic analytical column (5 cm of Phenomenex Luna SCX 5 µm + 5 cm of Michrom Magic C_{18} 5 µm). After injection of treated mouse placental tissue, 2D separation was performed by injecting a salt gradient in 10 steps, from 0.05 M to 0.5 M ammonium acetate. Control 1D experiments were used to verify the performance.

Courtesy of Dr. T. Kislinger, Ontario Cancer Institute (OCI), Canada



Extracted ion currents for 474.79 Th ion

Scoring Criteria	1D	2D -1	2D -2	Combined 2D
Protein Prophet 95% Peptide Prophet 95% 2 unique peptide minimum	413	1220	1390	1604
Protein Prophet 95% Peptide Prophet 95% 1 peptide minimum	524	1461	1670	1906
X! Tandem e score < -2.0 2 unique peptide minimum	476	1338	1540	1788
X! Tandem e score < -1.5 2 unique peptide minimum	518	1439	1656	1907
X! Tandem e score < -2.0 1 peptide minimum	788	2171	2354	2673

2D experiments identified 3-4 times as many proteins as 1D control

References:

Visit www.proxeon.com to see latest publications utilizing EASY-nLC

Unrivalled ease of use with built-in high performance

Installed and running within hours

- Shipped pre-configured and ready for use
- Simple to interface and synchronize with MS
- Wizard-style programming

Accurate, reproducible nanoscale chromatography

- Automatic system re-tuning
- Split-free, factory-configured flow paths minimize swept volume
- Flow sensors immediately before high-pressure mixing ensure accurate delivery of each mobile phase

Touch-screen control

- method set up

- batch set up

- system parameter overview

- interface to MS

Use 24/7 for up to 3 weeks

- 2 x 25 ml solvent bottles

Simple connection to columns/MS transfer lines and waste

Cooled autosampler

- 96 or 384 well plates (single or double height)
- Sample vials
- Wash and Waste bottles

"...while I found some other instruments good, the Proxeon system was like the iMac of nanoLCs"

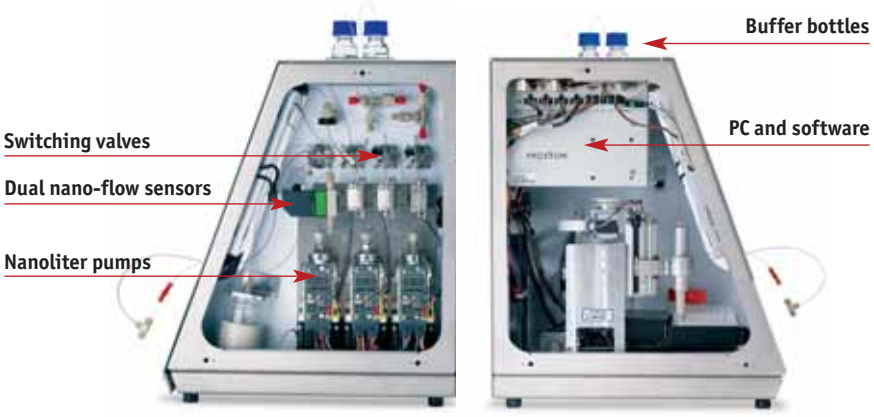
Dr. Jim Farmar, New York Blood Center

Easy maintenance, access and service

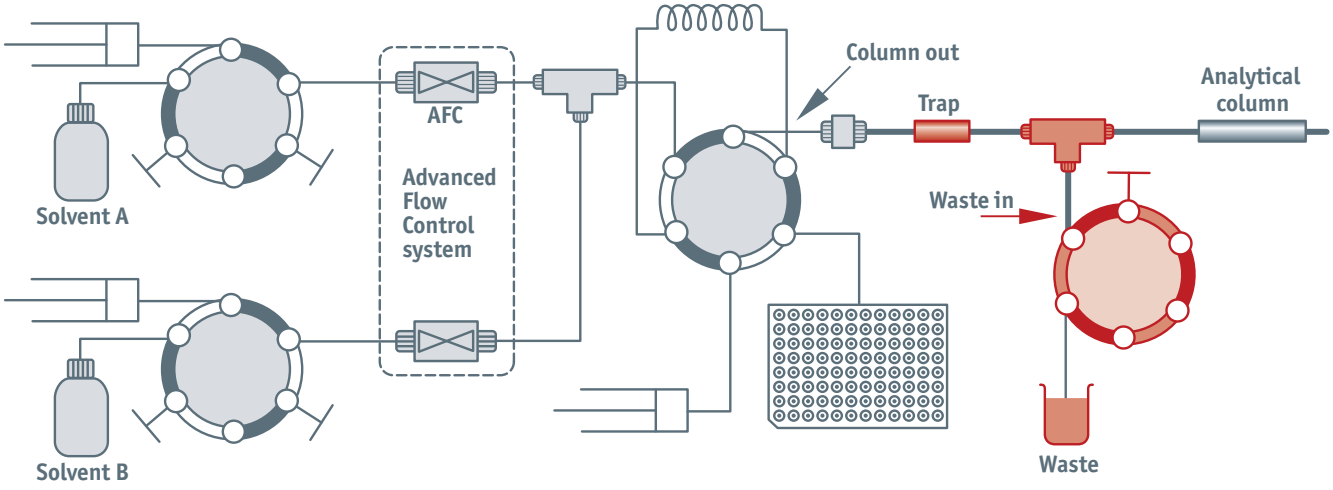
"...It's so simple to use, I even installed the second one myself. And their service has been excellent."

John M. Asara, Mass Spectrometry Core,
Beth Israel Deaconess Medical Center, Boston, MA.

- **Built-in PC & software**
  - automated, built-in maintenance steps
  - remote access via internet for system interrogation
  - event log for troubleshooting
- **Modular design for easy component exchange**
- **Pulsation-free pumps minimize need for replacement of seals, valves and fittings**



Easily switch between 1 or 2 column configuration



Combine with EASY-SPOTTER for purification and preparation prior to MALDI analysis

EASY-nLC with EASY-SPOTTER™

- **Complete control from separation to target**
  - purify samples, collect fractions and spot onto MALDI targets
- **Monitor the spotting process on the dual display**
  - close-up viewing to inspect drop formation and deposition plate overview to follow overall progress

Plate tray with exchangeable adapters

EASY-SPOTTER

Prepare nanobore LC columns with a high pressure column packer

- **Pack nanobore LC columns or electrospray emitters**
- **Load samples onto LC columns or emitters**
- **Use with columns or emitters from 50 mm in length, maximum length unlimited**
- **Three-way valve included for fast pressurization and depressurization**
- **Inserts supplied to hold 0.5 mL and 1.5 mL test tubes and glass vials**
- **Includes standard fittings for capillaries of O.D. ~375 µm, other ferrules can be used**

Specifications	
Autosampler	
Injection loops	20 µL (10 µL or 50 µL optional)
Pick-up volume range	0.1 – 18 µl (with standard 20 µl loop); Step volume: 0.01 µL
Pick-up reproducibility (injection RSD)	0.2% at 5 µL pick-up; 3.0% at 100 nL pick-up
Pick-up linearity	Test with BSA: 0.9985 at 0.5 – 10 µL injection volume Tests with caffeine: 0.9995 at 0.3 - 1.6 µL injection volume
Flow range	Sample pick-up: 0-40 µL/min
Injection pump	Single-acting syringe pumps each with sapphire piston and 140 µl reservoir
Refill speed	40 µL/min
Injection loop bypass volume	497 nL
Carryover	Typically < 0.05%. Two extra solvents (in addition to water/solvent A) are available for repeated custom wash cycles for thorough cleaning of injection needle
Formats	1 x 96 well microplate; 1 x 384 well microplate; 4 x 6 vials
Cooling	20 degrees below ambient
Gradient pump system	
Flow ranges	Gradient: 20 nL/min – 2,000 nL/min; 100 nL/min – 1,000 nL/min (recommended); Loading and re-equilibration: up to 300 µL/min (back-pressure-limited)
Gradient swept volume	92 nL
Pumps	Single-acting syringe pumps with sapphire piston and 140 µl reservoir. Refill speed: 100 µL/min
Valves	Four identical 6-port, 2 position micro-valves from Vici-Valco
Pressure range	0 – 340 Bar, 0-5000 p.s.i.
Retention time reproducibility (RT RSD)	Typically 0.1 – 0.4 % at recommended flow
Sensitivity (typical peak widths)	3-5 sec FWHM using a Proxeon analytical QC column (fused silica, 10 cm, 75 µm I.D., 3 µm C_{18}) supplied on delivery
General performance	
Flow system	Split free for better reproducibility and simpler architecture. Two flow sensors (one for each mobile phase) for accurate individual liquid measurements immediately before high pressure mixing. Simplified flow paths minimize number of components.
Configuration efforts and flexibility	Only two liquid connections to be made on the instrument front: column(s) and (optionally) a waste line. Power and LAN on the back. The factory configured flow paths minimize dead volumes and risk of internal connection leaks.
Installation requirements	Each unit is tested with a MS and required to pass a strict QC protocol. Units are shipped configured and ready for use. Installation takes only a few hours and can be done by non-expert technicians since most tuning steps are performed by software scripts
User friendliness	The touch screen display is the main interface. Method and batch setup is made in simple chromatography terms and using a wizard-like workflow.
Robustness	Excellent due to the minimal number of moving parts. The direct drive syringe pumps are completely pulsation-free, thereby minimizing wear and tear on seals, valves and fittings.
Tuning requirements	Good robust chromatographic performance is obtained with preinstalled default methods. Re-tunes itself after periods of not being used via a software script.
Maintenance requirements	Intelligent and built-in scripts automate most maintenance steps.
Serviceability	Modular components for rapid exchange. Easy access (30 seconds) to all components. Simple design with minimized number of components. Components are refurbished as sub-assemblies. Event log of sensor inputs and component actions speeds up troubleshooting.
Total cycle times (duty cycle)	Typically gradient run time plus 10 minutes
Mobile phase compatibility (wetted parts)	Fused silica, PEEK, 316 Stainless steel
Dimensions	Integrated system; Width x Depth x Height: 35 cm x 38 cm x 45 cm (14'' x 15'' x 18''); Weight: 30 kg
MS drivers	HyStar 3.2, Xcalibur 2.0
Remote support	Secure, direct internet access for rapid, online diagnostics by Proxeon specialists.
Accessory	EASY-SPOTTER for spotting prior to MALDI MS analysis

Ordering information

- **EASY-nLC**
  Integrated unit includes: 3 nanoliter pumps, 4 valves, cooled autosampler, computer, touch-screen, dual flow sensors. Also controls EASY-SPOTTER (LC300).
  Order Code: LC100
- **EASY-SPOTTER**
  Controlled and powered by EASY-nLC.
  Order Code: LC300
- **High Pressure Column Packer and Sample Loader**
  Order Code: SP035
- **High Pressure Column Packer and Sample Loader with Integrated Stirrer**
  Order Code: SP036
- For spare parts, support and service, visit **www.proxeon.com**