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Seeking More Productive Chromatography? See Productivity in a New Light

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Timothy Cross, Sr. Regional Marketing Manager – HPLC, Thermo Fisher Scientific, Hemel Hempstead, UK

The world leader in serving science

- Benefits of increased productivity
- Productivity enhancements in:
 - Sample preparation
 - Gas chromatography
 - Ion chromatography
 - CDS software
- New productivity workflows with the Thermo Scientific™ Vanquish™ Duo UHPLC system
 - Dual LC
 - Tandem LC / LC-MS
 - Inverse Gradient
- Mass spectrometry for chromatographers – The new Thermo Scientific™ ISQ EM single quadrupole mass spectrometer





PRODUCTIVITY

Easy of use

**Improved
quantification**

**Efficient use of
bench space**

**Increased sample
knowledge**

**Increased return
on investment**

**Lower cost per
sample**

**Higher
throughput**

**Improved resource
utilisation**

Separate your productivity from the status quo



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Seeking More Productive Chromatography?

Sample Preparation

Product Overview

The Thermo Scientific™ TraceGOLD™ TG-PAH columns are the part of TraceGOLD GC column family. They are specifically designed to meet or exceed the requirements for analyzing trace level polycyclic aromatic hydrocarbons (PAHs) in food and environmental samples.

Customers

GC, GC-MS and GC-MS/MS users

Markets

- Food safety
- Environmental
- Academic and research
- Industrial (Tobacco, rubber, toy...)
- Contract testing labs

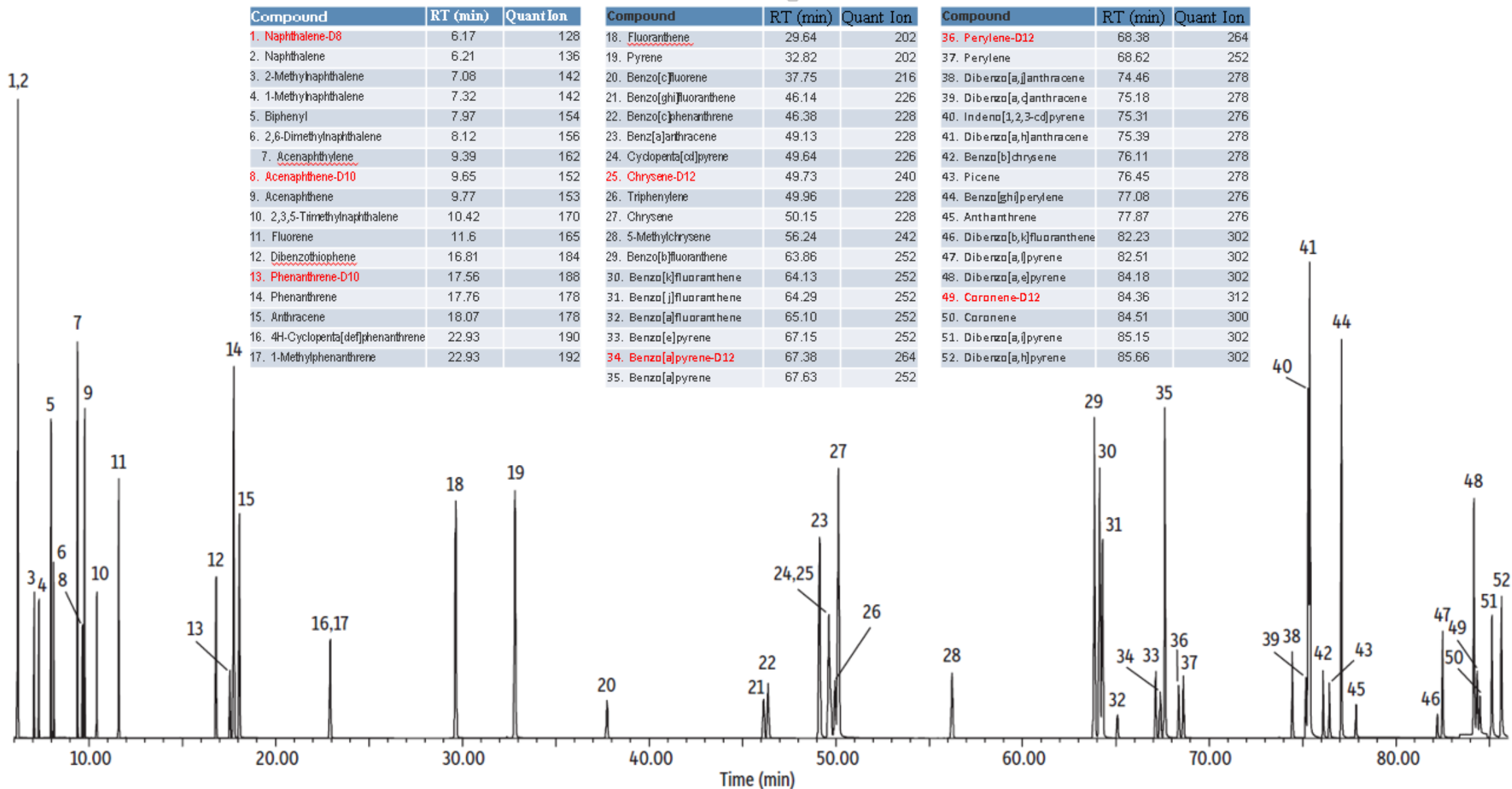
Key Features and Benefits of TraceGOLD TG-PAH Columns

- **Fast analysis of regulated PAHs** – Increases sample throughput for high productivity labs
- **Maximize resolution for critical isobaric PAHs** – Avoids false positive and provides accurate results
- **Max. temperature of 360°C** – Allows analysis of high boiling point PAHs such as dibenzopyrenes
- **Robustness and stability at high temp** – Deliver consistent and reliable results
- **Low column bleed** – Low detection limits for trace analysis

new

26055-0470	TraceGOLD TG-PAH, 30M x 0.25MM x 0.10UM	Fast and sample capacity
26055-3570	TraceGOLD TG-PAH, 40M x 0.18MM x 0.07UM	Fast and full separation
26055-0120	TraceGOLD TG-PAH, 60M x 0.25MM x 0.1UM	Complete separation and sample capacity

52 PAHs on 60m TraceGOLD TG-PAH Column



Why is the Quality of the Glass Used for Vials so Important?

Analysis down to the last fg
Best results with the best glass

You use a vial from a good brand, you may use a silanized vial, but are you sure you are not losing compound, especially, when the analyte remains for a longer time in the vial (e.g. as no. 50 in the autosampler) and you work with traces?

Or did you always have the feeling, that your quantification is not as accurate as it should be.

Thermo Scientific **Thermo Scientific™ Chromacol™** GOLD-Grade vials are the solution. These vials meet every Pharmacopeia's requirements and provide a significant better low adsorption surface compared to all standard vials on the market with no surface treatment.

Test the for FREE now: www.thermofisher.com/test-now



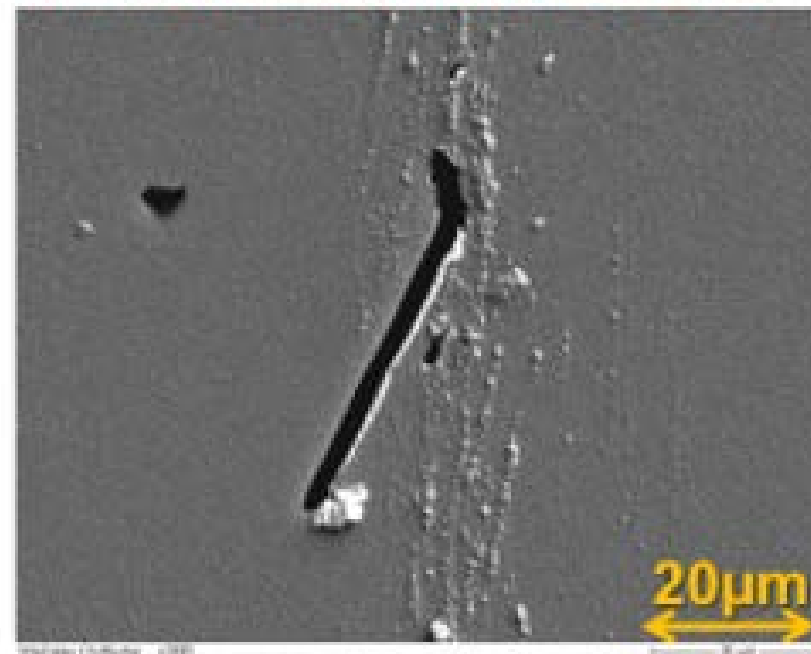
A Surface is Never Smooth!!

Vial/Glass quality comparison, 1st hydrolytic class glass types,
33 vs. 70

33 expansion glass, clear



70 expansion glass, clear





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Gas Chromatography

ISQ 7000 GC-MS and TSQ 9000 GC-MS/MS System Highlights

Thermo Scientific™ ISQ™ 7000 single quadrupole GC-MS and Thermo Scientific™ TSQ™ 9000 GC-MS/MS triple quadrupole GC-MS/MS systems

Ultimate **sensitivity** with Advanced Electron Ionization source

Extended **uptime** with inherent robustness and NeverVent™ technology

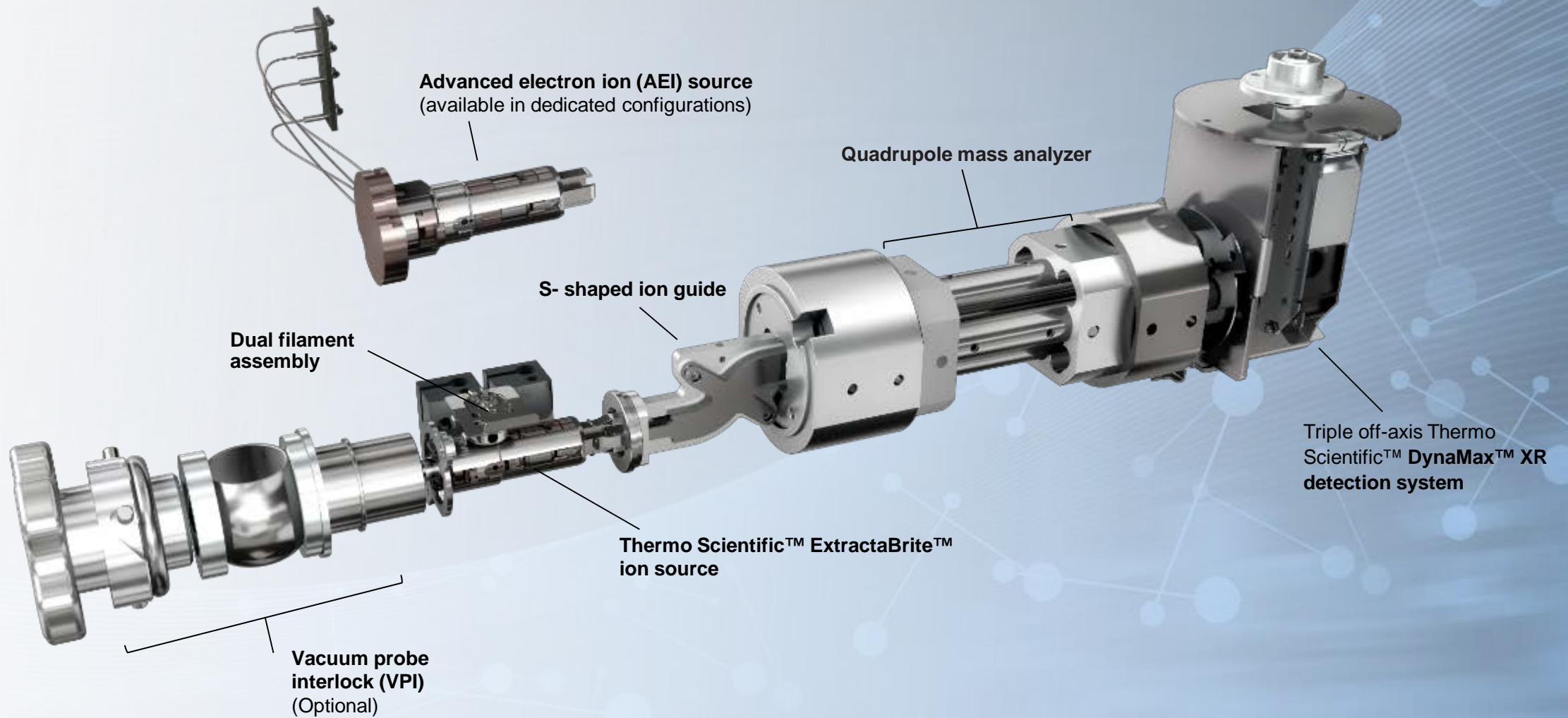
Routine **ease of use** from method development to daily operation

True **scalability** to face evolving regulatory requirements

UNSTOPPABLE



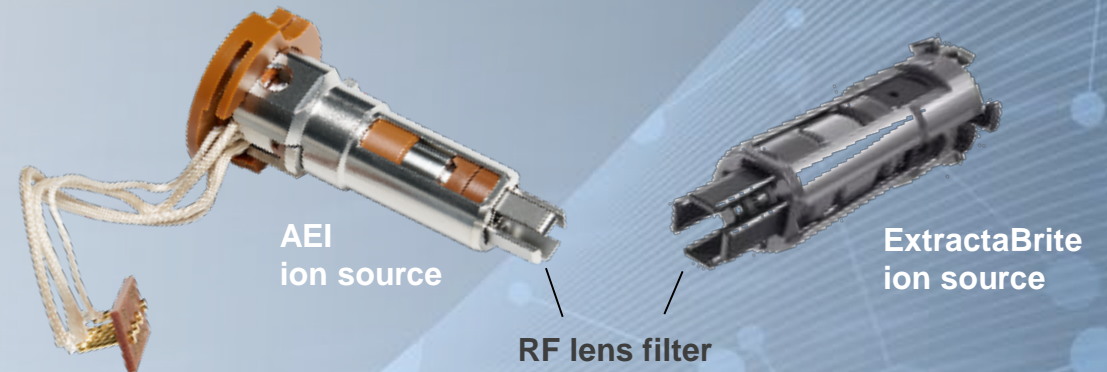
ISQ 7000 GC-MS System – Designed with Intention



Introducing the Advanced Electron Ionization (AEI) source

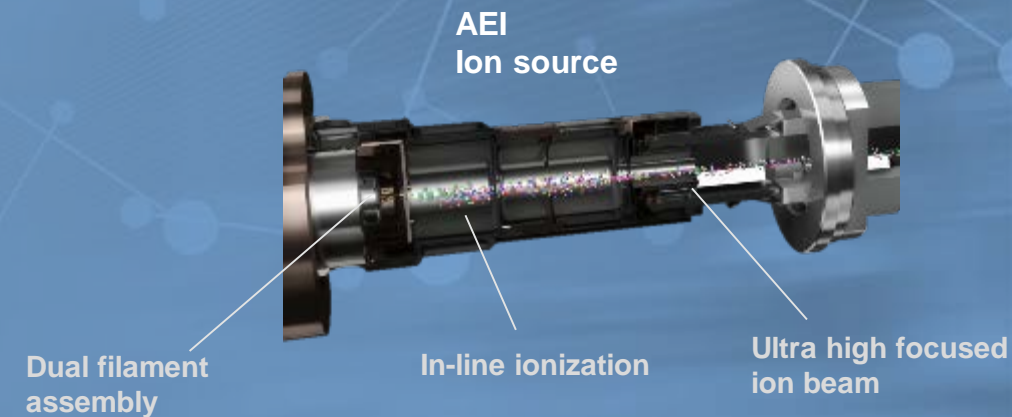
Inheriting from the ExtractaBrite ion source

- Highly inert material
- Independent dual heater
- Proprietary RF lenses
- Dual filament design

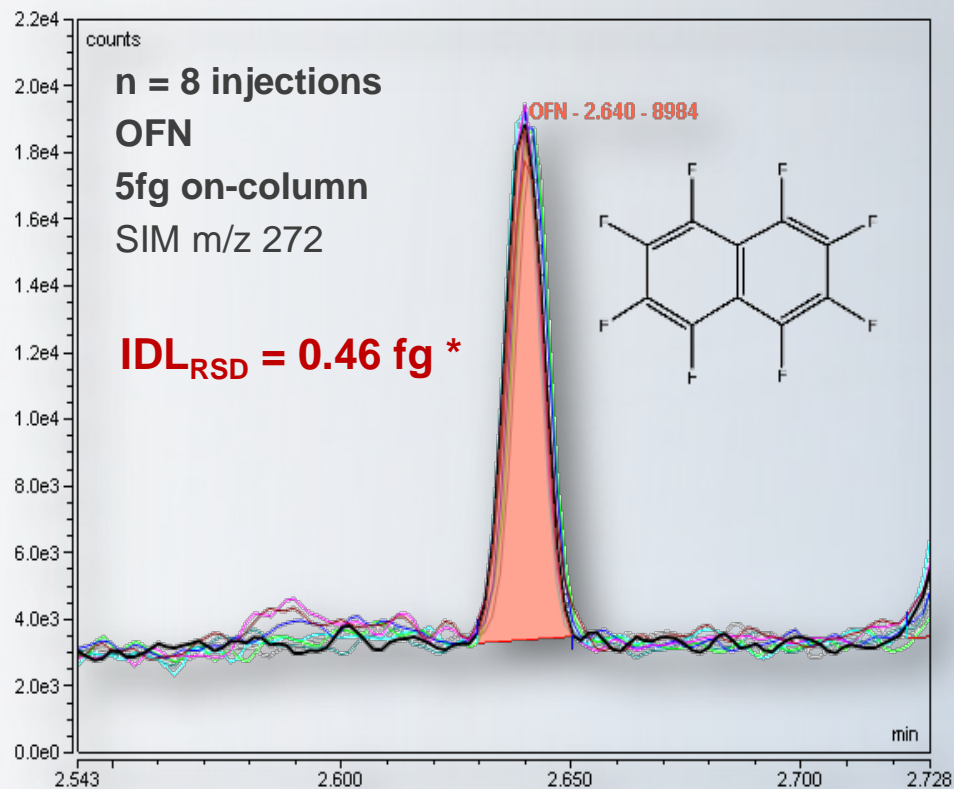


Adding innovative design for superior sensitivity and robustness

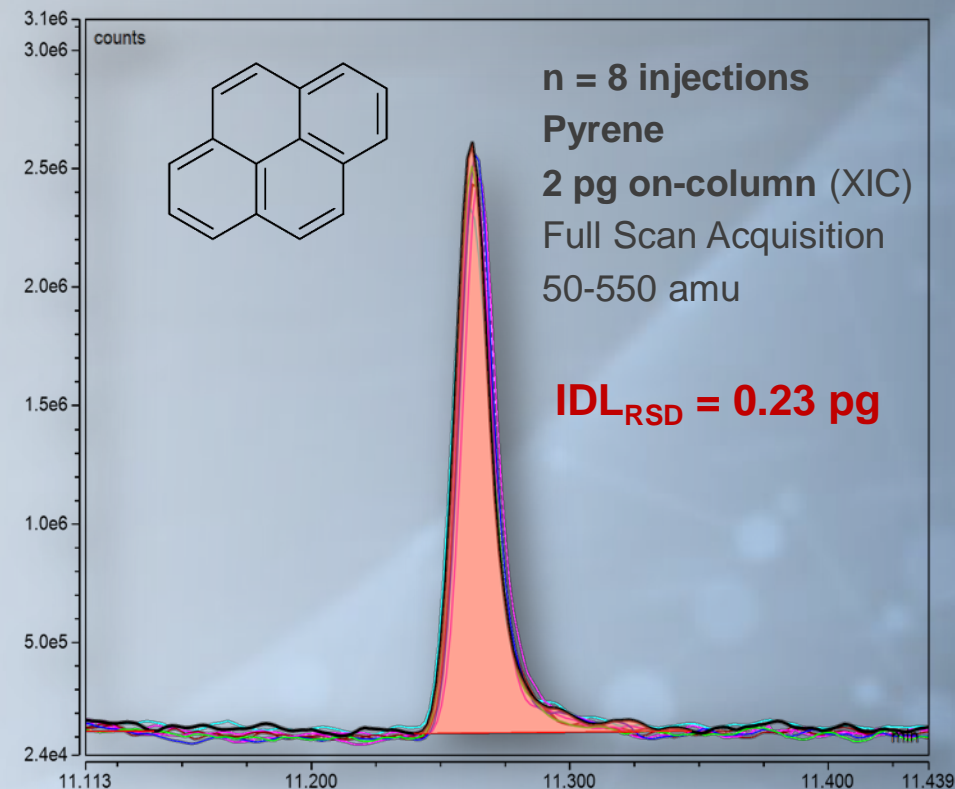
- Highly efficient ionization
- Tightly focused ion beam



ISQ 7000 AEI System - Push Boundaries of Sensitivity



*IDL <1 fg verified at installation under predefined conditions



- New ion source design for higher ionization efficiency leading to extra sensitivity
- High confidence in qualitative and quantitative results for traces analysis in difficult matrices
- Extended sensitivity in full scan for highly confident untargeted screening

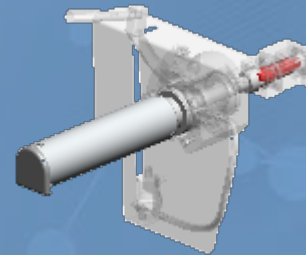
Ion source robustness built-in

- Highly inert material with independent dual heaters
- Proprietary RF lenses keep matrix burn contained
- **AEI source** with tight ion beam reduces lens contamination



NeverVent technology

- Unique vacuum probe interlock (VPI) design
- Vent free GC column exchange
- Vent free ExtractaBrite ion source exchange



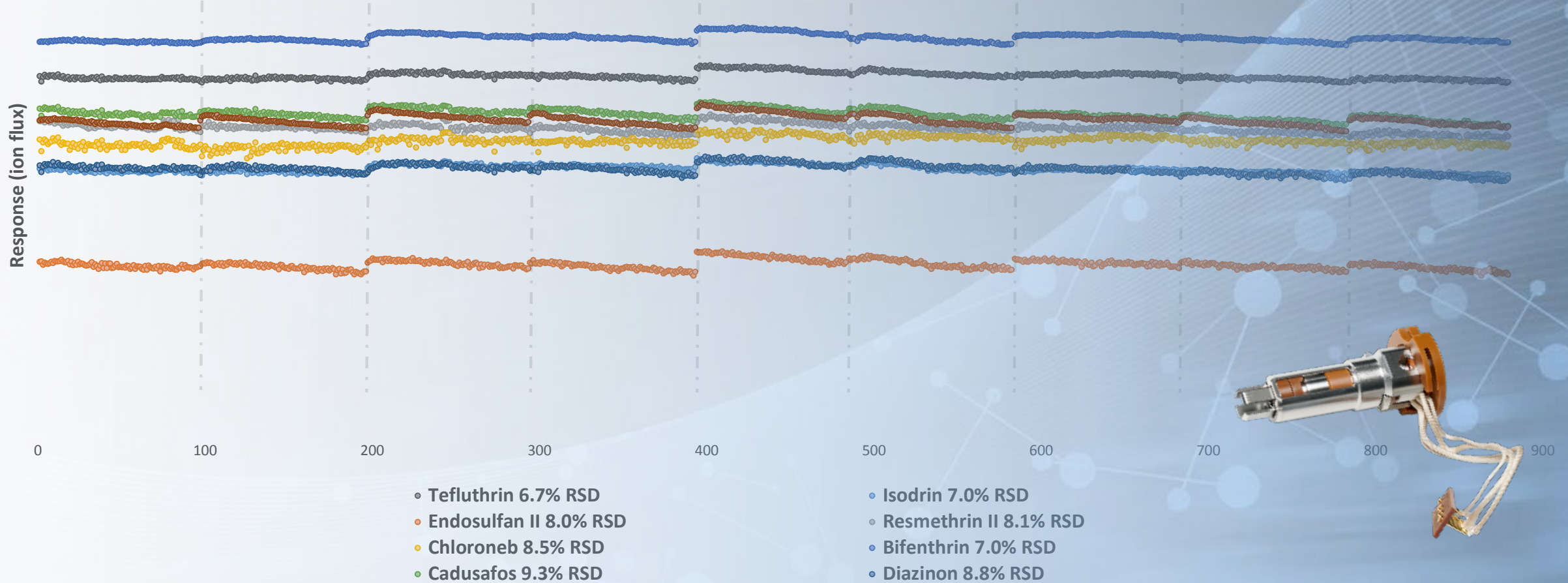
AEI robustness ~900 Acetonitrile QuEChERS injections

150 pesticides
monitored at 10 ppb
in **carrot and
potato baby food**

Liner change
and SmartTune
every ~100
injections

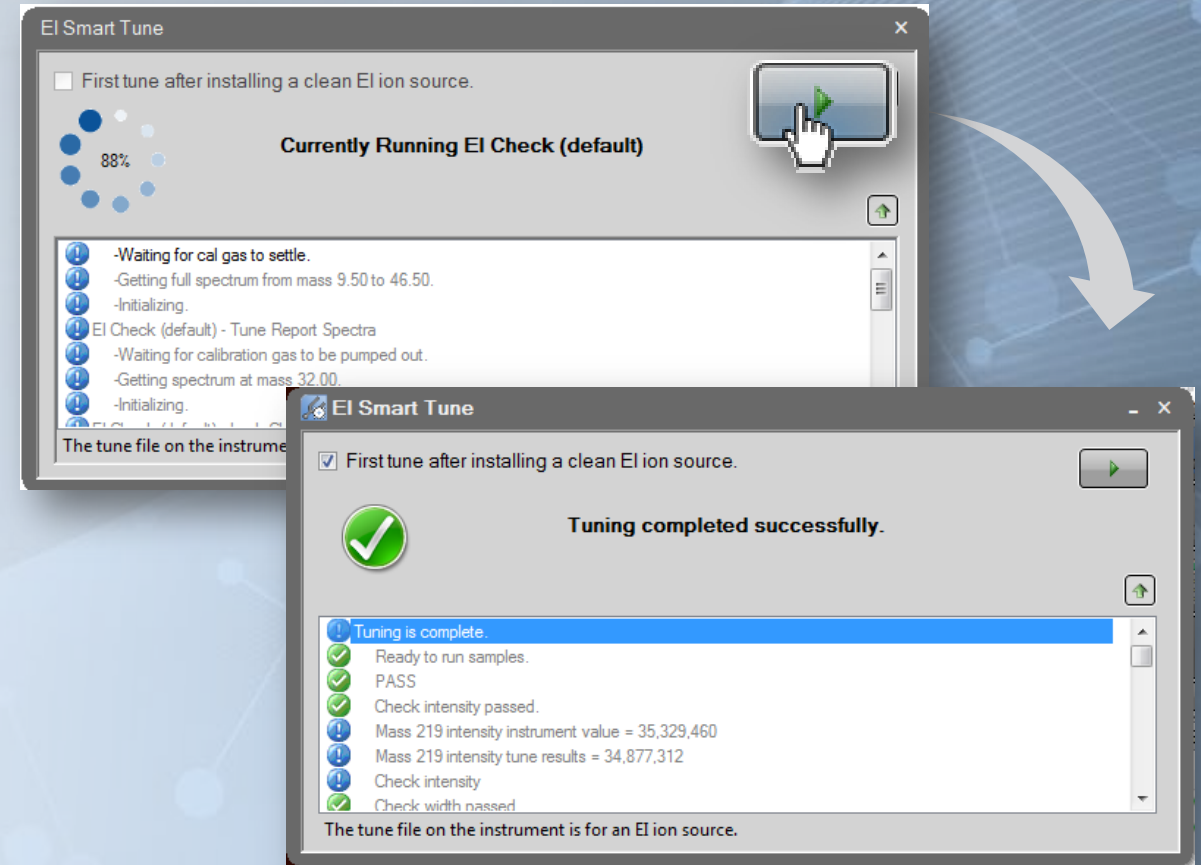
No AEI source
cleaning

→ <20% RSD for >90% of
pesticides monitored



SmartTune – Spend less time tuning the MS. Return to running samples sooner

- New simplified tuning tool for ISQ and TSQ instruments
- Ensures your system is performing at the level you require
- Efficiently checks and tunes the system
- Intelligently eliminates any unnecessary steps in the process, resulting in faster tuning operations
- Advises on necessary corrective actions
- User customizable targets to facilitate consistency in performance



ISQ 7000 GC-MS and TSQ 9000 GC-MS/MS Systems

For more information

thermofisher.com/unstoppableGCMS





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Seeking More Productive Chromatography?

Ion Chromatography

The Thermo Scientific™ Dionex™ Ion Chromatography Product Line

RFIC

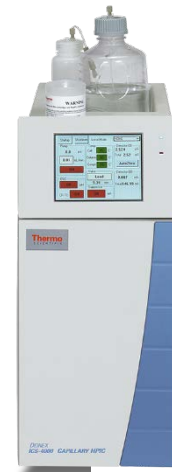
HPIC



Thermo Scientific™
Dionex™ Aquion™
system



Thermo Scientific™
Dionex™ Integriion™
system



Thermo Scientific
Dionex ICS-4000
system







Thermo Scientific
Dionex ICS-6000 system



Introducing the Dionex ICS-6000 HPIC System: What's New?

Accelerate your productivity

- Single or dual channel configurations
- Thermo Scientific™ IC PEEK Viper™ fittings 
- Thermo Scientific Dionex Consumables Device Monitor 
- Unity Remote Services 
- Tablet control of the IC system 
- HPIC capable up to 5000 psi
- Automated eluent generation (RFIC-EG eluent generation without manual eluent preparation))
- Always ready system operation with capillary IC

Explore the possibilities

- Standard bore, microbore, and capillary formats
- Flexible detector options

IC – MS enabled

Compatible with Thermo Scientific™ ISQ™ EC single quadrupole, triple quadrupole, and high-resolution accurate-mass (HRAM) Thermo Scientific™ Orbitrap™ mass analyzer mass spectrometers

Solve complex analysis challenges

- 2-D ion chromatography for trace-level analysis
- Improved method reproducibility for complex carbohydrate analysis using **Dual EGC** control

FEATURES

- Automatically track consumables **without human intervention**
- Confirm installation
- Monitor usage
- Store and retrieve performance metrics
- Data are permanently stored on the consumable itself

VALUES

- Assists with fulfillment of audit and documentation needs
- Increased awareness of usage and replacement frequency
- Elimination of manual log book entries
- Removes competitive lock-out
- Error prevention for new/novice IC users

VALUES

- Assists with fulfillment of audit and documentation needs

Save a day of hunting down documentation = \$500. Get a bonus of looking good and avoiding stress.

- Increased awareness of usage and replacement frequency

Plan ahead and avoid a day of downtime while awaiting consumables shipment. Potential savings: 32 samples at \$50 each = \$1600.

- Elimination of manual log book entries

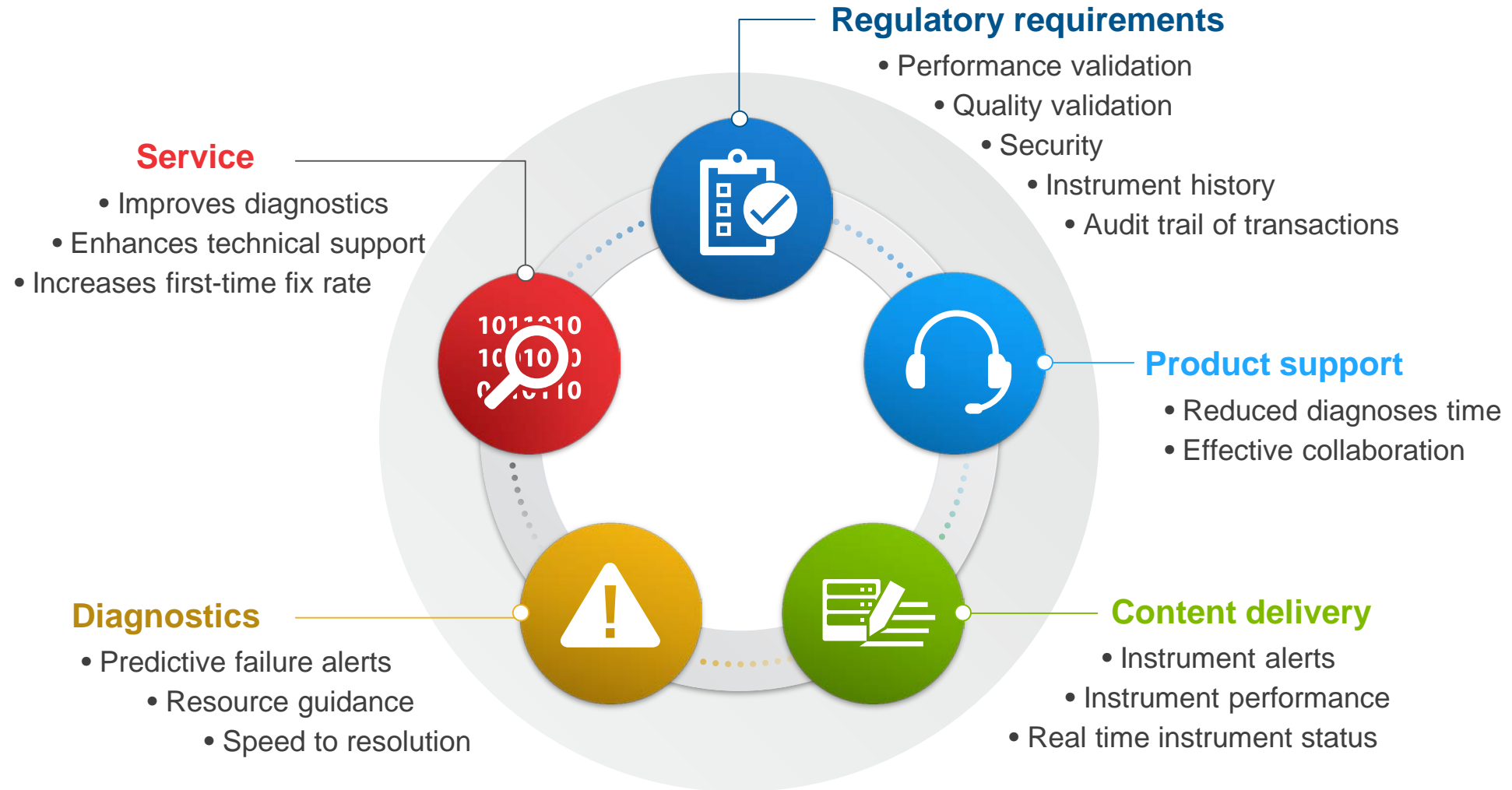
Eliminate 15 minutes/day = \$1600/year. Have confidence that the recorded information is 100% correct.

- Removes competitive lock-out
- Error prevention for new/novice IC users

Maintain productivity even when novice IC users replace consumables. Eliminate risk of destroying consumable. Potential savings: \$1600/year



Unity Remote Services



NOTE: Remote Services not available in some areas



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Seeking More Productive Chromatography?

Chromatography Data System (CDS) Software

Chromeleon Chromatography Data System (CDS) – Proven Efficiency Gains

Thermo Scientific™ Chromeleon™ chromatography data system (CDS)

Proven efficiency gains for lab productivity

- Significant productivity gains reported by range of customers from different industries
- Productivity gains have been verified by direct competitor comparison
 - Head to head comparison of same tasks (prescribed by customer) in each CDS

<50%

Mouse clicks

<50%

Windows

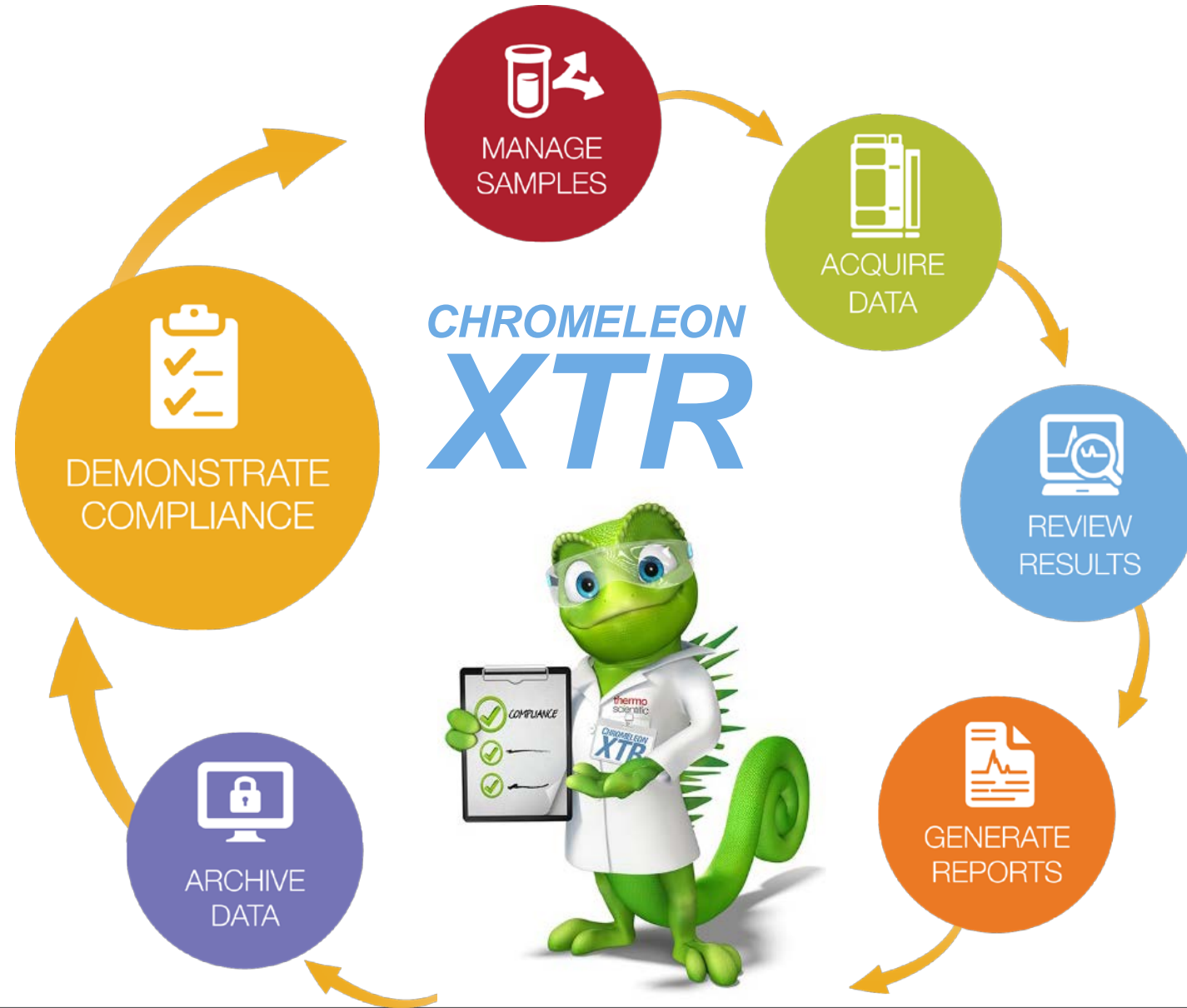
>50%

Faster

Brian Alliston, Sterling Pharma

*“Having previously used several other CDS systems, Chromeleon proved to be a **very intuitive** system. It has a ‘familiar feel’ which means it’s **easy to learn**. The user interface is **simple and clear** and **everything is where you would expect it to be**. I find the system **easy to use** and **training new staff is easy**.”*

Chromeleon XTR – More Than a CDS



Chromeleon CDS Just Got Smarter

More than a CDS – Thermo Scientific™ Chromeleon™ XTR Laboratory Management System manages the entire laboratory, ensuring adherence to processes, maintaining data integrity and facilitating complete regulatory compliance.



Your samples



Your instruments



Your data



Your results



Chromeleon XTR Laboratory Management System

Key benefits of Chromeleon XTR:

- Sample management and data archiving across the lab
- Secure, compliant control of all analytical data regardless of instrument vendor or type
- Analyses can only be performed by authorized trained individuals on calibrated, in-service instruments
- Designed for 24/7 continuous uptime

The screenshot shows the Chromeleon XTR Home Page interface. At the top, there's a navigation bar with 'File' and 'Help' menus. Below that, the 'Home Page' is displayed with the Thermo Scientific logo and the 'CHROMELEON XTR' title. The main area contains a grid of 12 icons representing various functions: Login Samples, Move Sample, Sample Details, Label Samples, Sample Summary Report, Archived Scientific Data, Create Sequence, Manage Sequence, Check Instrument Status, Acquire Data, Enter Results, and Display Results. Below the icons, there are three data tables: 'Samples', 'Chromatography Sequences', and 'Instrument Calibration and Maintenance Schedule'. The 'Samples' table has columns for Sample, Location, and Sample Name. The 'Chromatography Sequences' table has columns for Name, Analysis, and Instrument. The 'Instrument Calibration and Maintenance Schedule' table has columns for Name, Status, Calibration Date, and Service On.

Sample	Location	Sample Name
40	Workbench	DRUG-PROD-09-JUN-2017-0...
39	Workbench	DRUG-PROD-09-JUN-2017-0...
38	Workbench	DRUG-PROD-09-JUN-2017-0...
37	Reception	DRUG-PROD-09-JUN-2017-0...
36	Workbench	DRUG-PROD-09-JUN-2017-0...

Name	Analysis	Instrument
USP Drug Product 29...	ID-HPLC	ULTIMATE3
USP Drug Product 28...	ID-HPLC	ULTIMATE3
USP Drug Product 27...	ID-HPLC	ULTIMATE3
USP Drug Product 23...	ID-HPLC	ULTIMATE3
USP Drug Product 22...	ID-HPLC	ULTIMATE3

Name	Status	Calibration Date	Service On
Acq 002	Requires Calbrat...	3/16/2017 12:00...	
Infinity01	Requires Servicing	8/5/2016 8:12 PM	
Integron	Available		
Lambda 25	Available		
SY Series Balance	Available	6/10/2017 12:00...	
Trace1310gc	Available		
Ultimate 3000 - 1	Available	9/11/2017 1:00 AM	9/11/2017 ...

Built on the superior compliance capabilities of Chromeleon CDS, powered by Thermo Scientific™ SampleManager™ LIMS

Chromeleon CDS



Chromatography and mass spectroscopy

Designed for 24/7 operations
Advanced automation for better quality results
Multi-vendor, multi-technique
Support MS for development and QA/QC workflows

NEW!

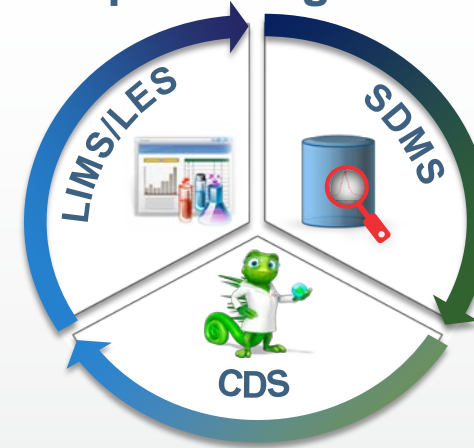
Chromeleon XTR



Chromeleon + Basic lab management + SDMS

Basic sample management and tracking
Analyses can only be performed by authorized, trained individuals on calibrated instruments
Long-term data storage and archival of data regardless of instrument type

Chromeleon CDS & SampleManager LIMS



Complete laboratory management

Comprehensive sample, test and result management
Management of lab personnel and resources
Specification management and ERP integration
Laboratory Execution System
Configurable to meet your end to end business process



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Thermo Scientific™ Vanquish™ Duo UHPLC Systems

Three Workflows. Two Flow Paths. One Integrated UHPLC Solution.



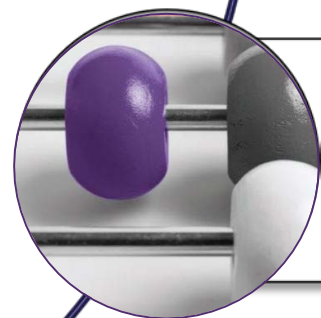
Dual LC

- A two channel LC system with standard footprint



Tandem LC/LC-MS

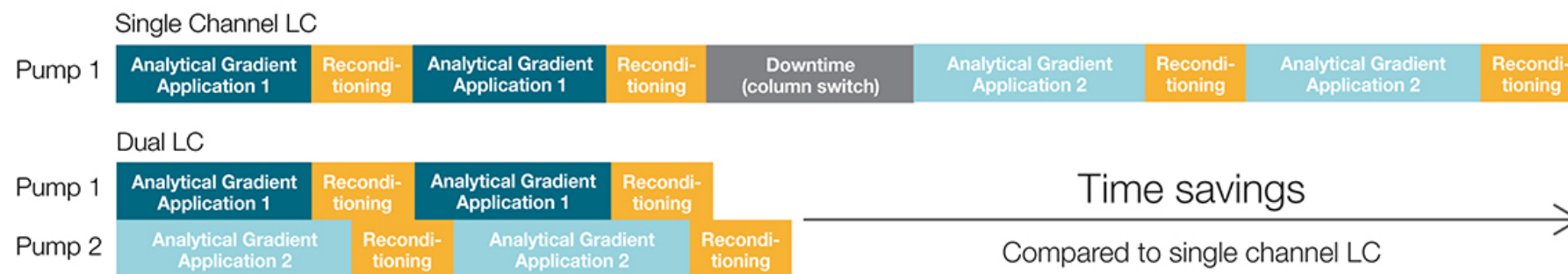
- System for efficient detector utilization



Inverse gradient

- System for advanced quantification capabilities

Vanquish Duo System for Dual LC



Vanquish Flex Dual Pump



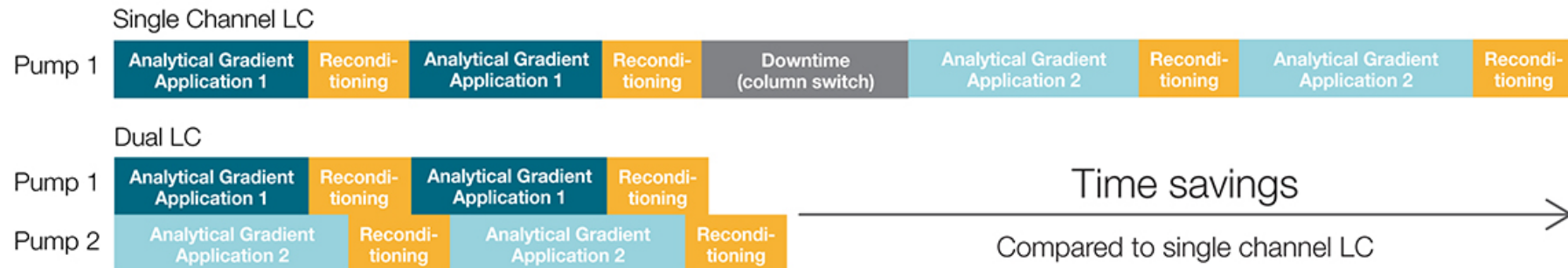
- 2 ternary pumps in one housing
- 1000 bar (15,000 psi) version
- Delivers 2 completely independent gradients

Vanquish Dual Split Samplers



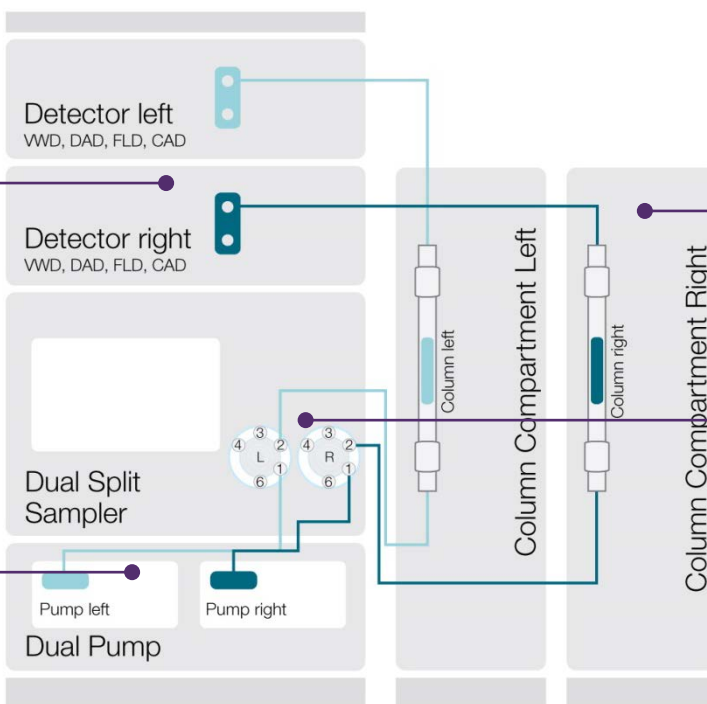
- 2 injection units in one autosampler
- 1000 and 1500 bar (15,000 or 22,000 psi) version
- Independent flow paths

Vanquish Duo System for Dual LC Instrument



Detectors

Any combination of two detectors ensuring sensitive and universal detections



Column compartment

Two columns in one or two column compartments for full application flexibility

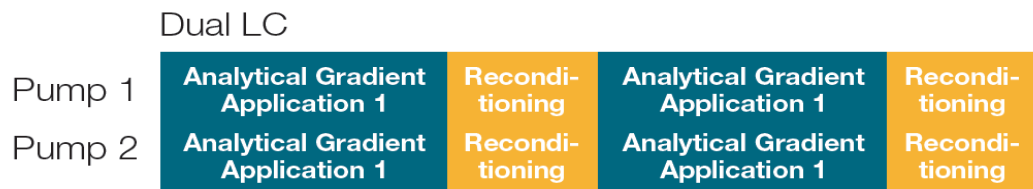
Pump

Two independent pumps in one housing

Autosampler

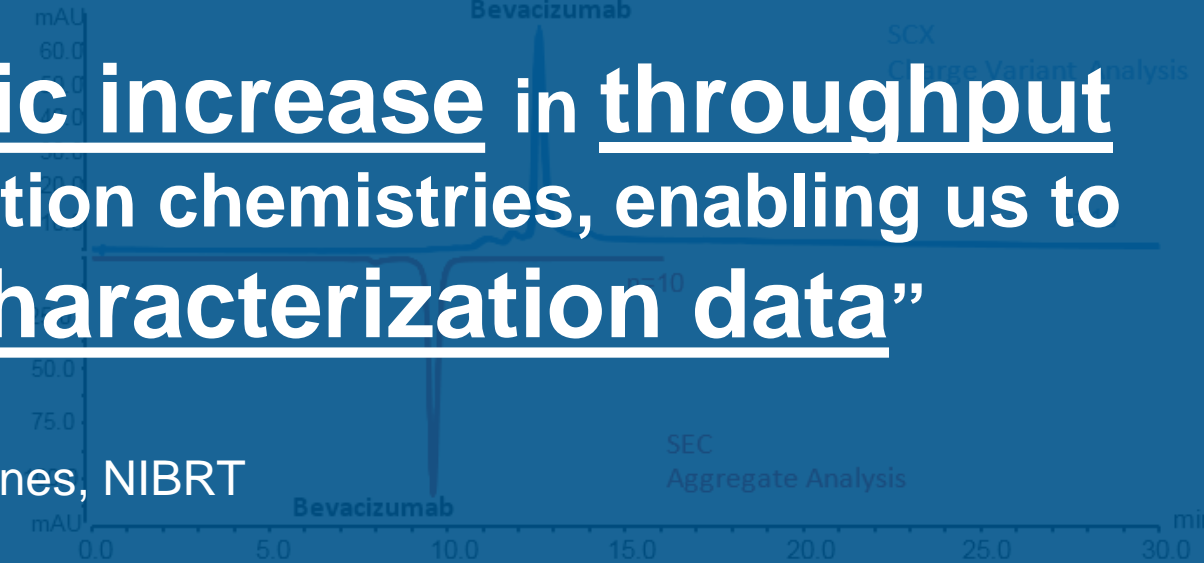
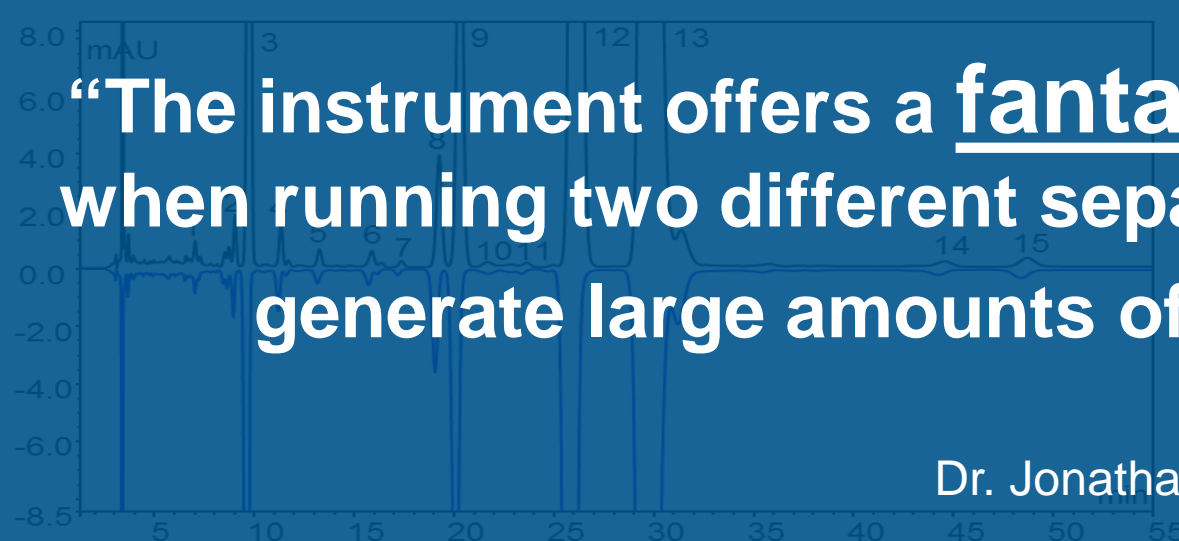
Two injection valves allowing the simultaneous analysis of completely different applications

What can be Accomplished with the Vanquish Duo System for Dual LC?



Run two identical columns

Run your complementary



“The instrument offers a fantastic increase in throughput when running two different separation chemistries, enabling us to generate large amounts of characterization data”

Dr. Jonathan Bones, NIBRT

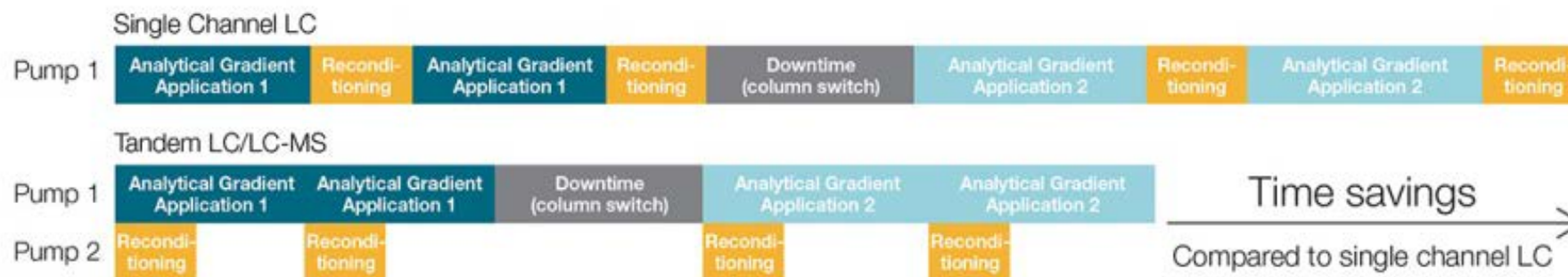
Be finished in half the time

Get more information out of every sample

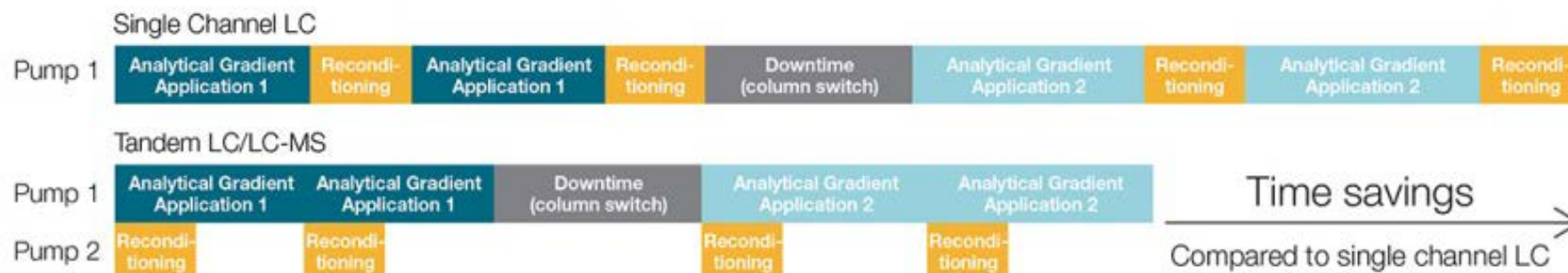
Finished in half the time

Efficient characterization

Vanquish Duo System for Tandem LC/LC-MS



Vanquish Duo System for Tandem LC/LC-MS Instrument

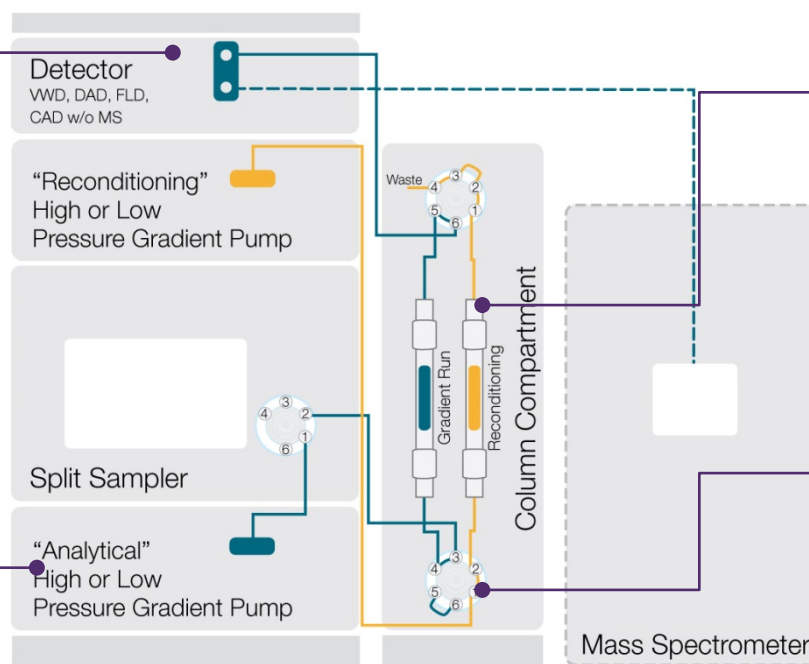


Detectors

Optional UV detector with pressure resistant, low dispersive flow cells

Pump

Flexible pump selection. Here High Pressure Gradient Pump for Analytical Gradient



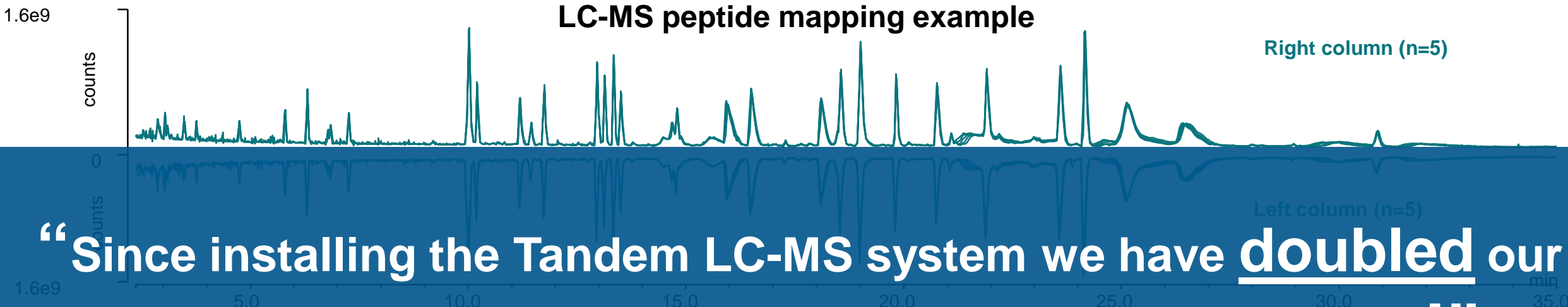
Column compartment
Two columns for parallel separation and column reconditioning

Column switching valve
Valve to switch between two columns to allow for offline column reconditioning

Key Benefits – Vanquish Duo System for Tandem LC/LC-MS

Increased throughput

LC-MS peptide mapping example

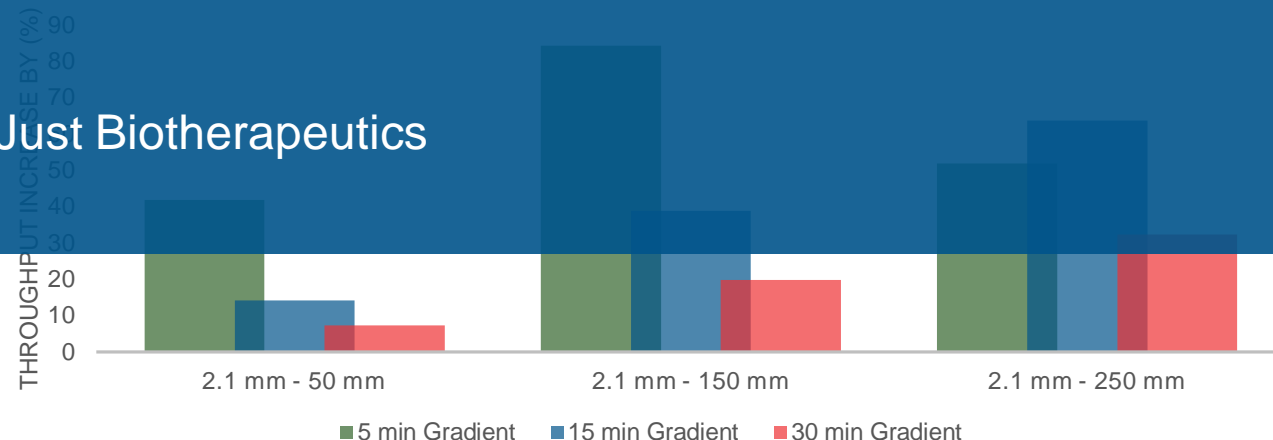


“Since installing the Tandem LC-MS system we have doubled our throughput and increased the precision of our data!”

Vanquish Duo for Tandem

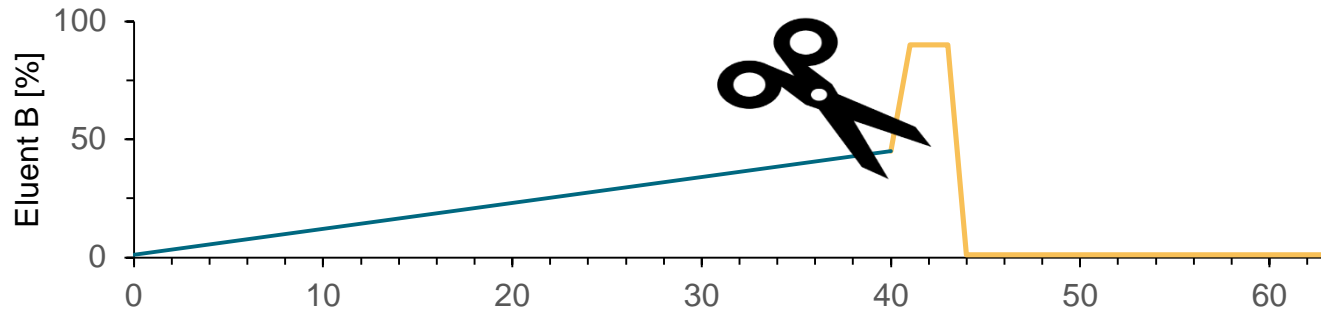
Richard Rogers, Just Biotherapeutics

Abs. RT Shift Column left to right [min]	Rel. RT Shift Column left to right [%]	RT RSD [%] n=10	Area RSD [%] n=10
0.023	0.18	0.11	2.47

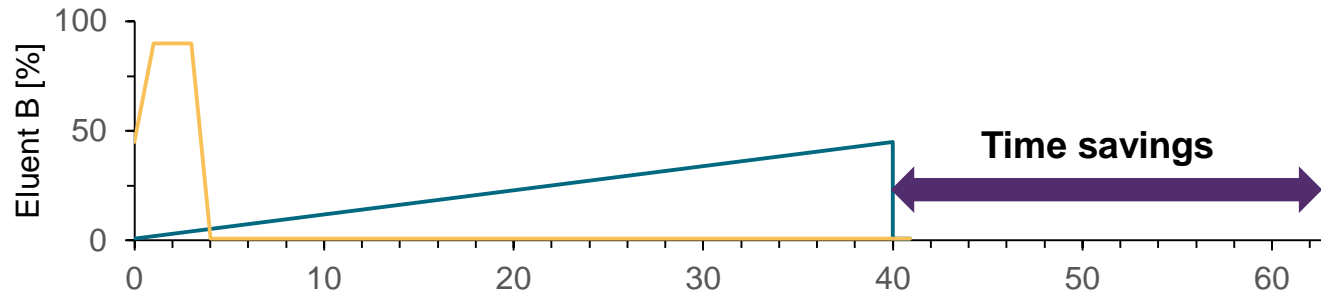


Key Benefits – Vanquish Duo System for Tandem LC/LC-MS

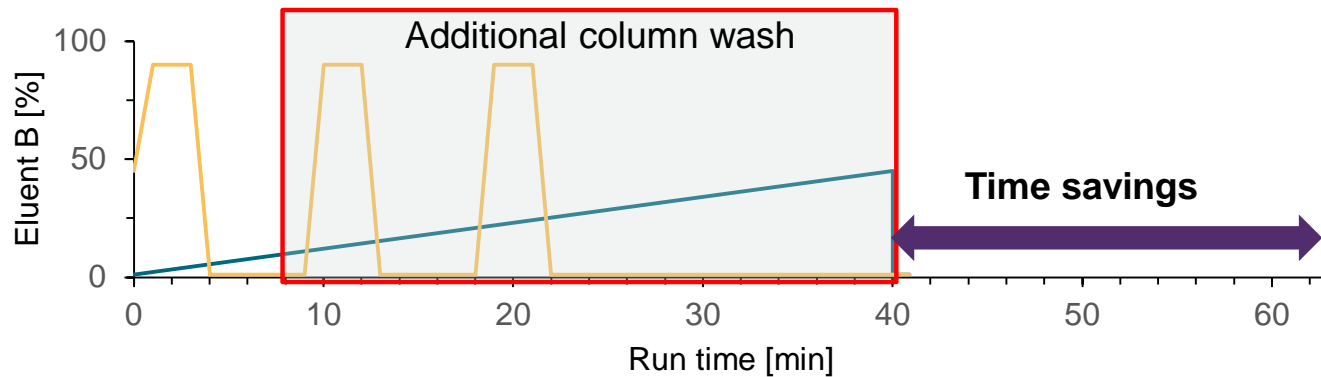
Advanced column wash without sacrificing throughput



Standard gradient profile

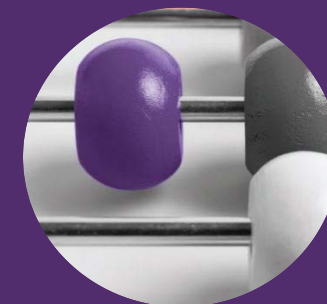


Tandem mode allows for time savings



Extra column washing steps without sacrificing throughput

Vanquish Duo System for Inverse Gradient



Standard LC



Inverse Gradient Method



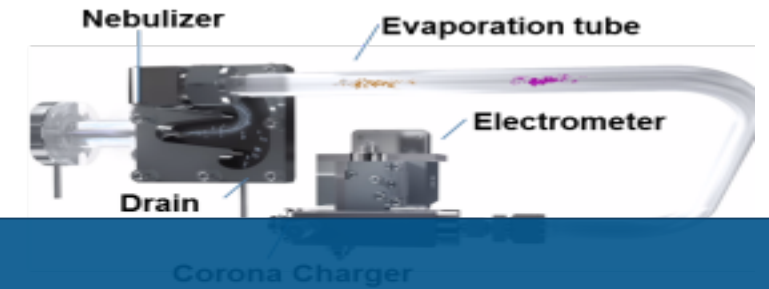
Unique Detectors: Charged Aerosol Detection

- Detection of substances without a chromophore
- Consistent analyte response independent of chemical structure
- Dynamic range up to four orders of magnitude and highest sensitivity
- Relative quantification using virtually any standard

See what others are missing



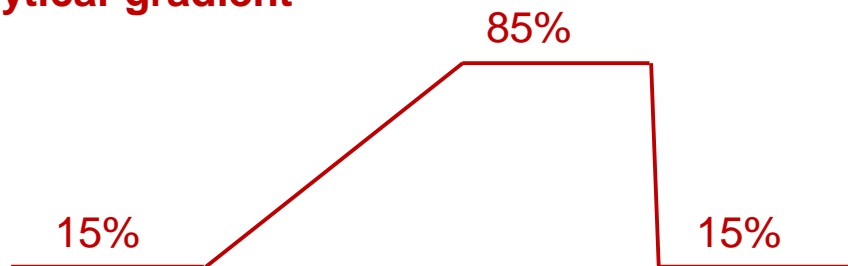
Comparison of charged aerosol detection (CAD) to UV and MS



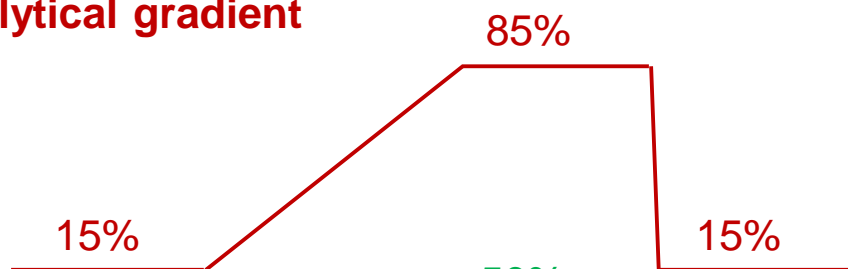
Saving costs for additional detectors or assays

Inverse Gradient Compensation for Uniform Response

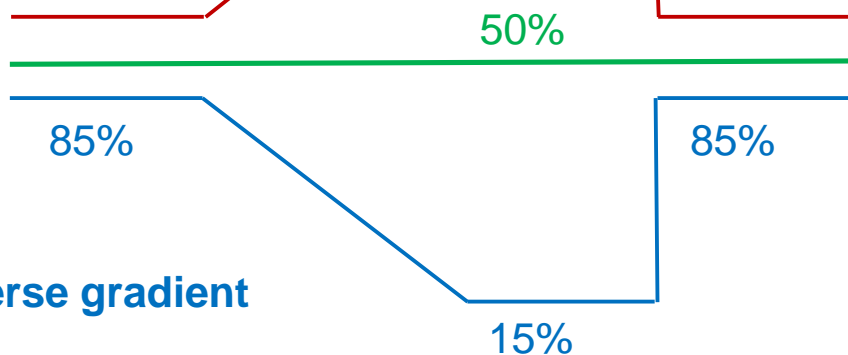
Analytical gradient



Analytical gradient



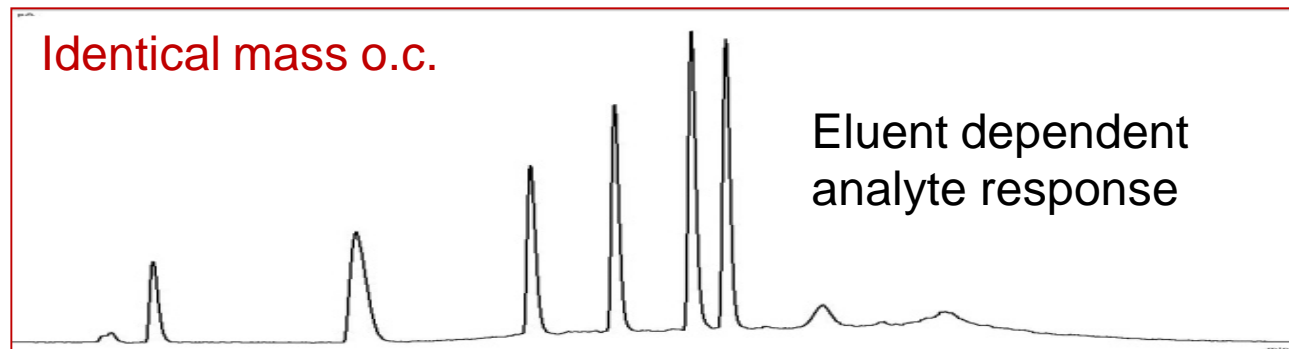
Inverse gradient



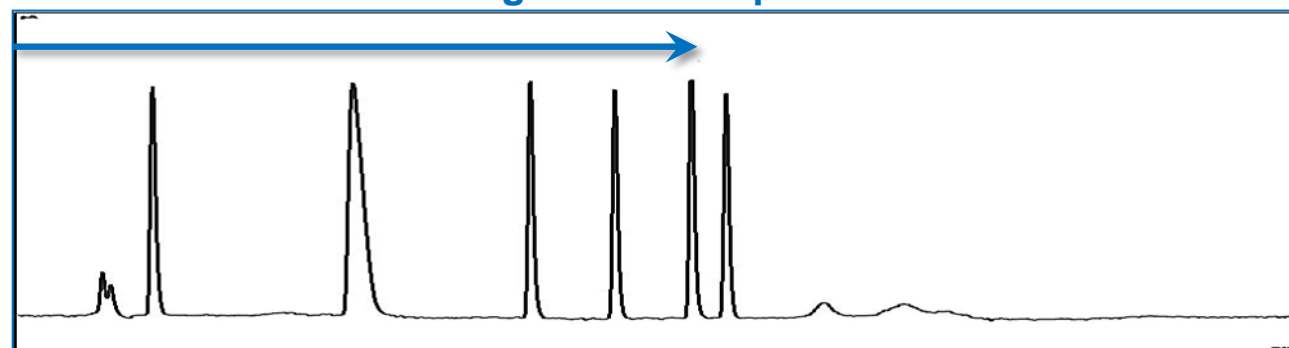
Eluent at detector

Eluent at detector

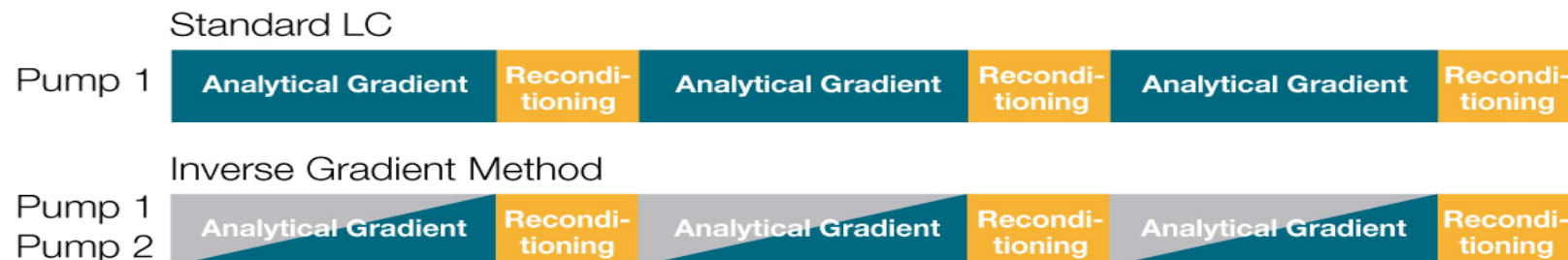
Conventional gradient elution



Inverse gradient compensation



Unique Vanquish Duo System for Inverse Gradient Instrument

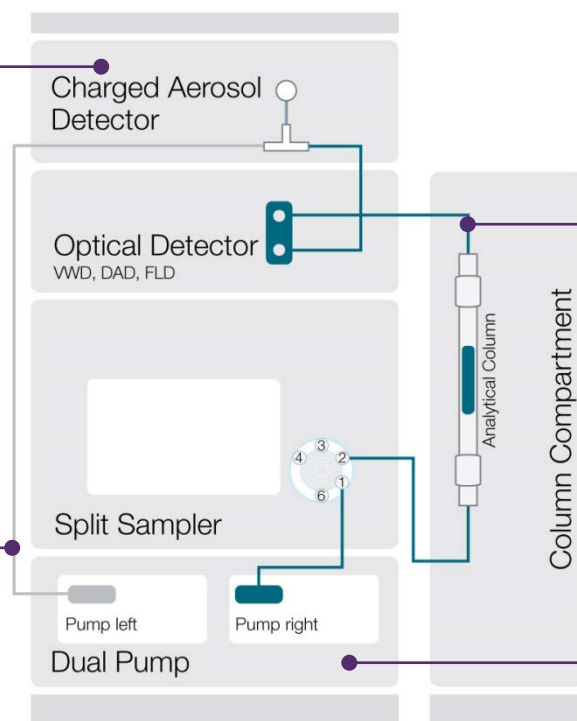


Detector

Universal charged aerosol detector to detect any non-volatile analyte

Compensation flow

Keep eluent at detector constant



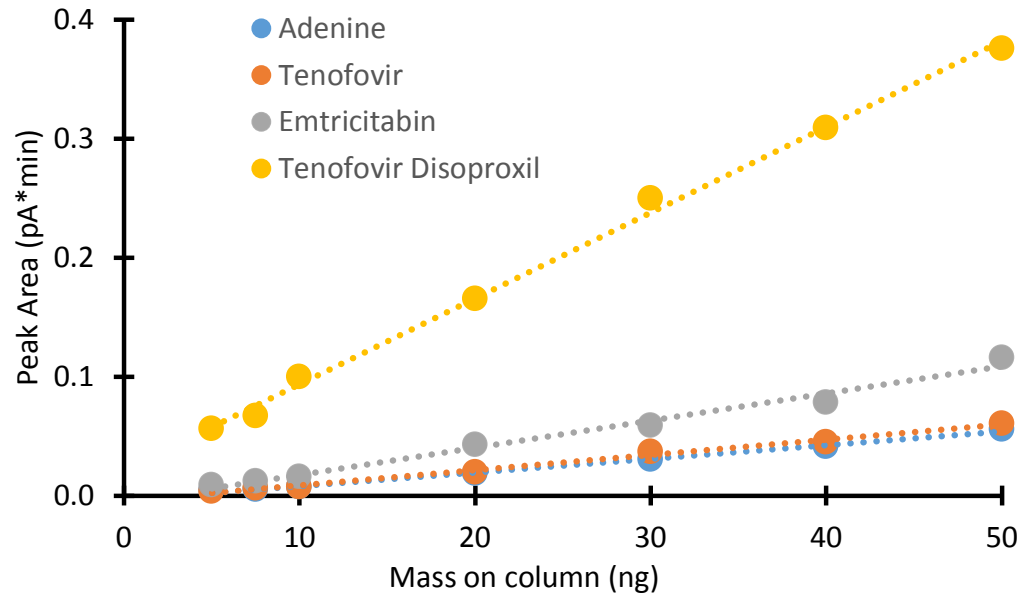
• Analytical flow path
With separation column

• Vanquish dual pump
Delivers analytical and compensation gradient

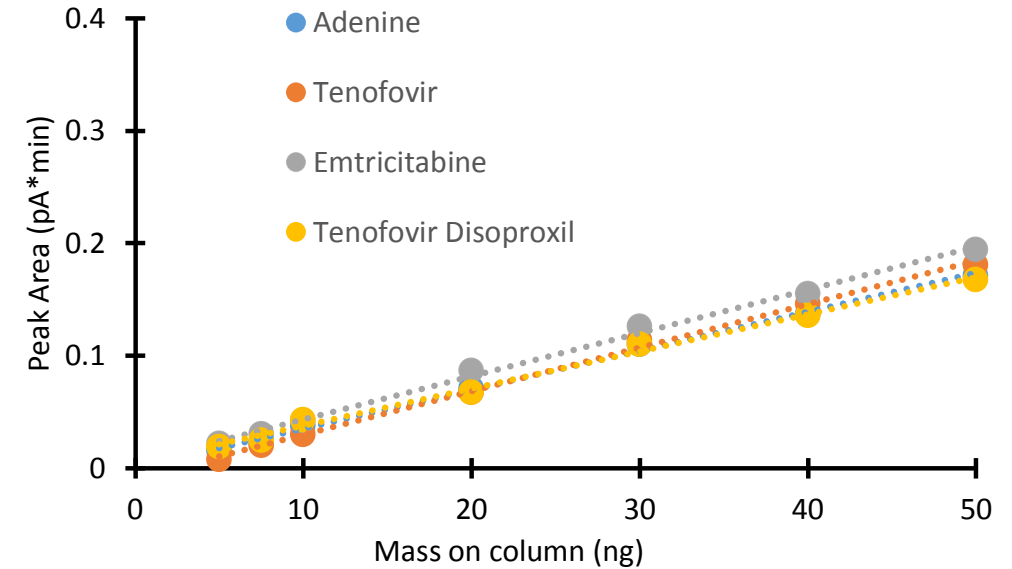
Key Benefits – Vanquish Duo System for Inverse Gradient

Standard free quantification

Without gradient compensation



With inverse gradient compensation



Similar response curves for all analytes after gradient compensation



ThermoFisher
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Thermo Scientific™ ISQ™ EM Single Quadrupole Mass Spectrometer

The world leader in serving science

Gain greater insights from your sample

- Unmatched low mass sensitivity
- Chromatographic peak confirmation

Resolve complexity

- Analyze complex sample matrices
- Hassle-free maintenance

Easily mastered

- Integrated tools to help master MS
- Hassle-free, seamless integration with IC or LC systems
- Embedded control by Chromeleon CDS

NEW! ISQ EC/EM Single Quadrupole Mass Spectrometers

- For ion chromatography (IC-MS) and liquid chromatography (LC-MS)
- Built for **routine** analysis and long term signal stability
- Controlled by **Chromeleon** chromatography data system (CDS)



ISQ EC single quadrupole mass spectrometer

- Mass range 10-1250 m/z
- HESI only
- Perfect for IC-MS or LC-MS



ISQ EM single quadrupole mass spectrometer

- Mass range 10-2000 m/z
- HESI and APCI options
- Perfect for LC-MS

New Single Quadrupole Mass Spectrometer – Key Features

- Enhanced low MW performance
- Durable, high-quality design
- High performing HESI II and APCI source
- Ultra-fast electronics
- Rugged and robust operation
- Innovative, smart software



The best real single quadrupole MS for novice and expert

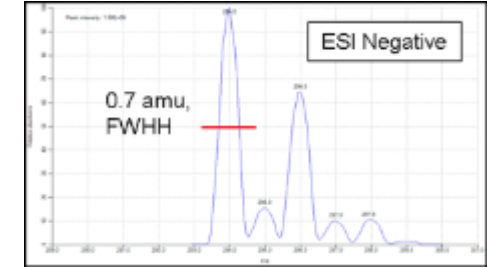
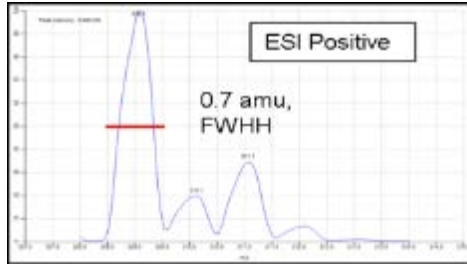
Performance and Specifications

Specification	ISQ EM	ISQ EC
Mass range (m/z)	10 – 2000	10 – 1250
Source type	ESI and ESI/APCI	ESI
Supported modes	Full scan / SIM	
Flow rate	Up to 2 mL/min	
Scan rate, max (Da/s)	Up to 20,000	
SIM sensitivity (ESI+)	10 pg Reserpine	
	SN > 400:1	
SIM sensitivity (ESI-)	20 pg Nitrophenol	
	SN > 500:1	
SIM sensitivity (APCI+)	10 pg Reserpine	n/a
	SN > 1000:1	n/a
SIM sensitivity (APCI-)	20 pg Nitrophenol	n/a
	SN > 80:1	n/a
Polarity switching	Yes, 25 ms	
Mass resolution	Unit (≤ 1.0 Da)	
Mass accuracy	$< \pm 0.1$ Da	
Mass stability	< 0.1 Da over 48 h	
Digital dynamic range	$> 10^7$	
Power	110–240 VAC 50/60Hz	

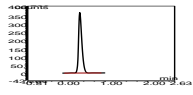
- ✓ Enhanced low mass detection for IC-MS
- ✓ Optional larger mass range and ESI/APCI combination source
- ✓ Very fast scanning for better UHPLC compatibility
- ✓ Fast polarity switching for experiments with positive and negative scans
- ✓ Global power supply with 110V – 240V built-in support

Outstanding performance and speed

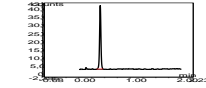
Performance - Testing Spectral Quality at UHPLC Scan Speeds



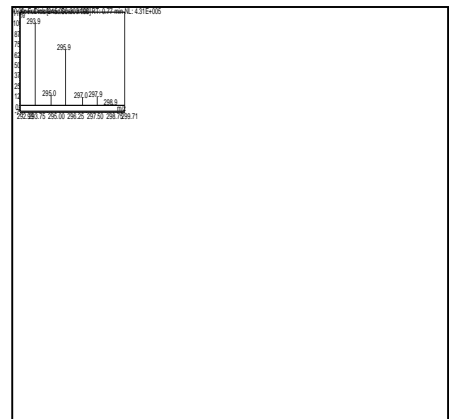
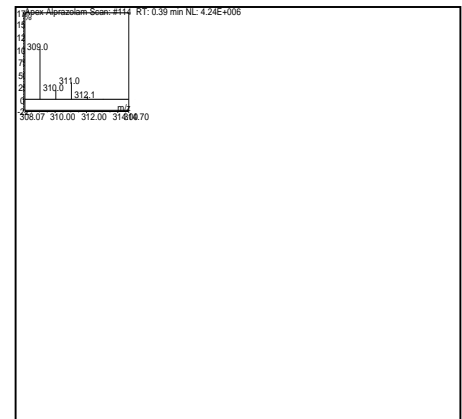
Unit mass resolution and accurate isotope ratio detection, even at UHPLC scan speeds.



Apex spectra displaying C¹³, C³⁵, C³⁷ stable isotope ratios for alprazolam (left) and diclofenac (right).



m/z	Theoretical	Observed
309	100	100
310	18.4	18.7
311	32.5	33.6
312	6.0	6.1



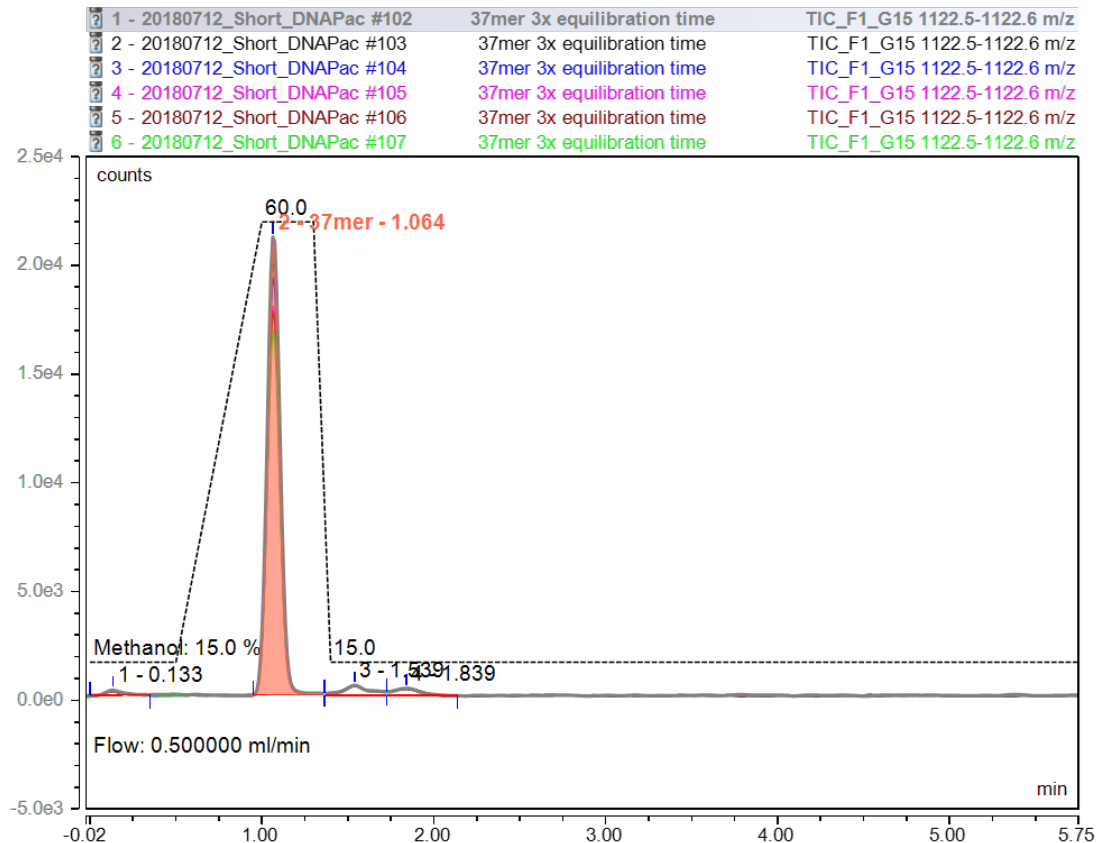
m/z	Theoretical	Observed
294	100	100
295	15.2	12.5
296	64.49	67.5
297	9.92	10.1
298	10.41	11.0
299	1.59	1.4

Maintaining peak shape (quality) at high scan speeds - boosting productivity with HPIC/UHPLC

New Key Application – Quality Control of Synthetic Oligonucleotides (Slide 1 of 2)

Increased confidence through mass confirmation and impurity identification for DNA analysis by adding MS data to a UV-based quality control method

AN72820



Parameter	Setting														
Column	Thermo Scientific™ DNAPac™ RP 2.1 x 10 mm, 4 μm (P/N 088925)														
Eluents	A: 200 mM HFIP, 8.0 mM TEA, pH 8.0 B: methanol														
Injection Volume	1 μL														
Analytical Gradient	0.5 mL/min flow rate														
	<table border="1"> <thead> <tr> <th>Time (min)</th> <th>%B</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>15</td> </tr> <tr> <td>0.5</td> <td>15</td> </tr> <tr> <td>1</td> <td>60</td> </tr> <tr> <td>1.3</td> <td>60</td> </tr> <tr> <td>1.4</td> <td>15</td> </tr> <tr> <td>3</td> <td>15</td> </tr> </tbody> </table>	Time (min)	%B	0	15	0.5	15	1	60	1.3	60	1.4	15	3	15
Time (min)	%B														
0	15														
0.5	15														
1	60														
1.3	60														
1.4	15														
3	15														
Column Temp.	50°C forced air mode, 50°C active preheater														
Autosampler Temp.	4 °C														
UV Settings	λ=260 nm, 10 Hz data collection rate, 0.5 s response time														
MS Settings	HESI source type, easy ESI source settings for 0.5 mL/min flow rate														
MS Full Scan	<table border="1"> <tbody> <tr> <td>Time</td> <td>0 – 3 min</td> </tr> <tr> <td>Mass range</td> <td>600 – 2000 m/z</td> </tr> <tr> <td>Dwell Time</td> <td>0.5 s</td> </tr> <tr> <td>Polarity</td> <td>negative</td> </tr> <tr> <td>Source CID voltage</td> <td>5</td> </tr> </tbody> </table>	Time	0 – 3 min	Mass range	600 – 2000 m/z	Dwell Time	0.5 s	Polarity	negative	Source CID voltage	5				
Time	0 – 3 min														
Mass range	600 – 2000 m/z														
Dwell Time	0.5 s														
Polarity	negative														
Source CID voltage	5														

Reproducible chromatography with easy main peak mass confirmation

New Key Application – Quality Control of Synthetic Oligonucleotides (Slide 2 of 2)

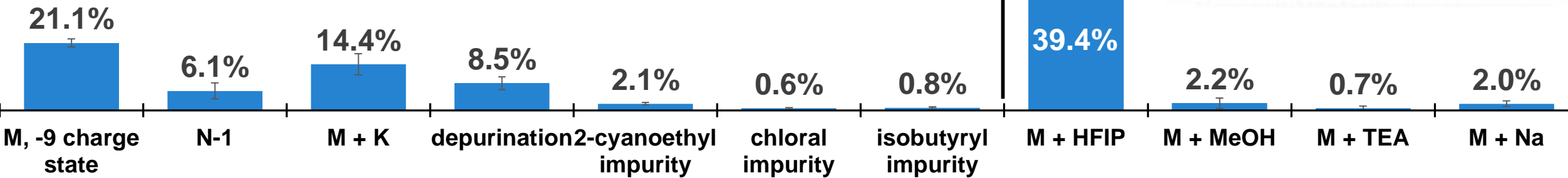
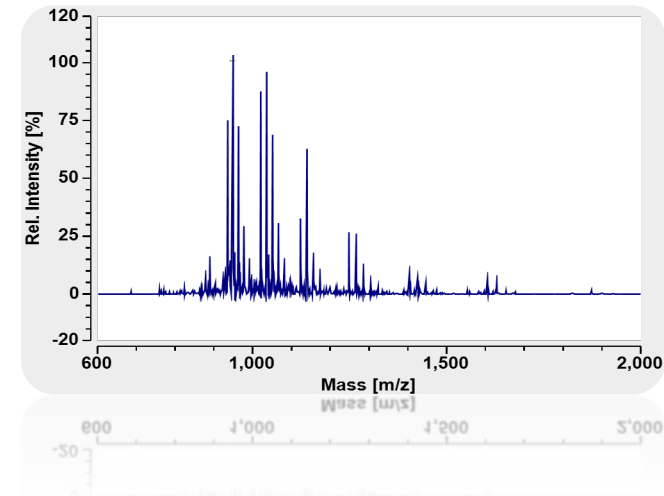
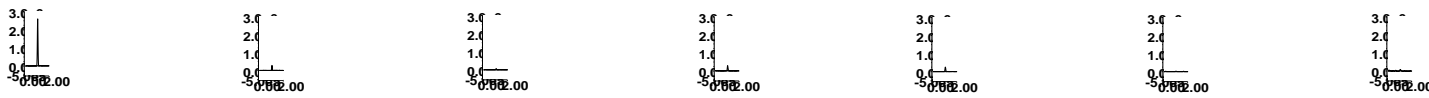
Increased confidence through mass confirmation and impurity identification for DNA analysis by adding MS data to a UV-based quality control method

AN72820

Impurities

Solvent adducts

XICs of Full Scan (600-2000 m/z, 0.2 s dwell time)

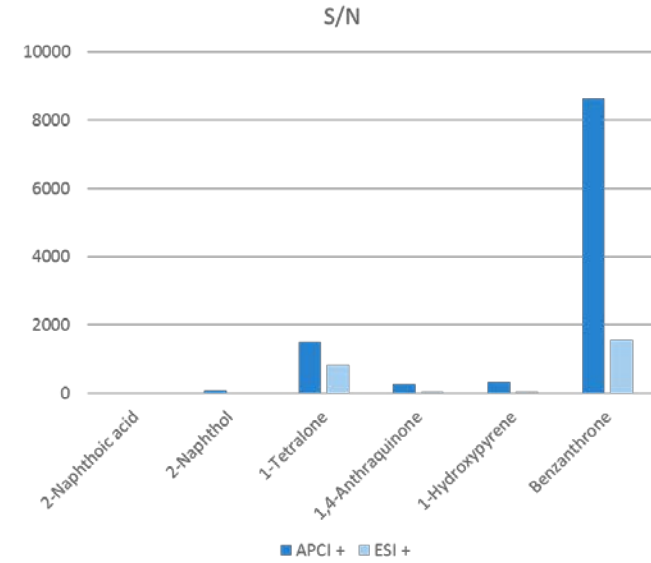
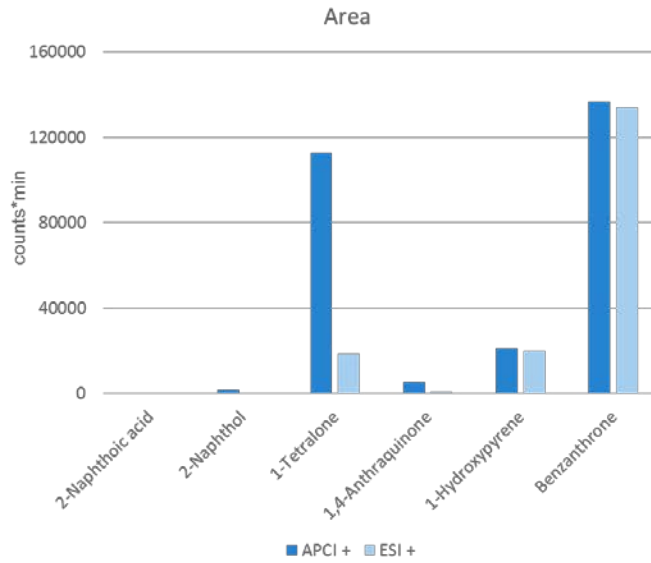
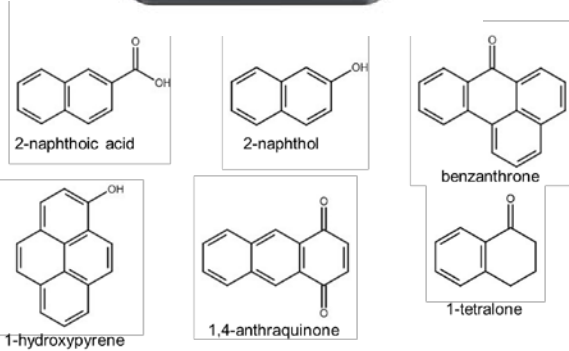
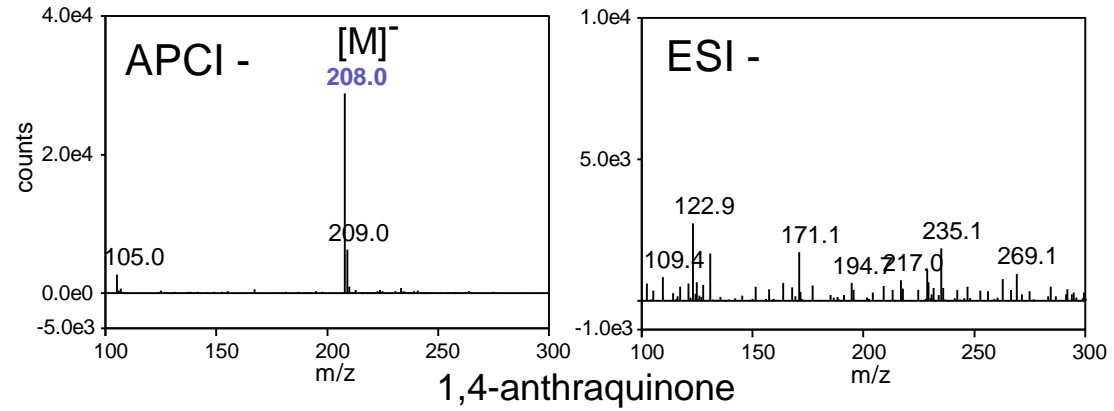
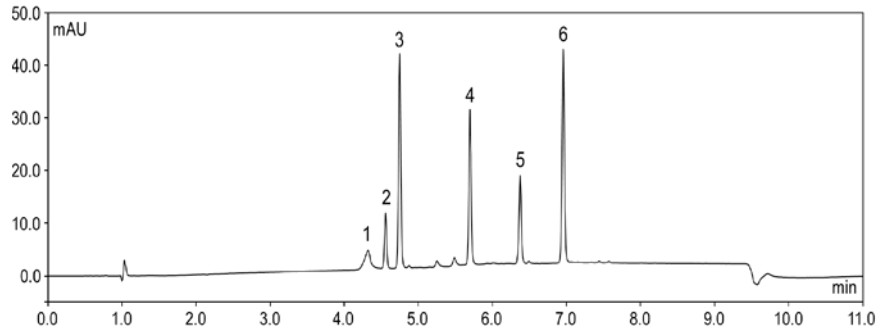


Full set of additional information on top of the UV-signal – more insight, better results

New Key Application - Detection of oxy-PAHs in APCI and ESI Mode

Demonstrate benefits of APCI-MS detection of oxy-PAHs compared to ESI-MS detection

AN72819

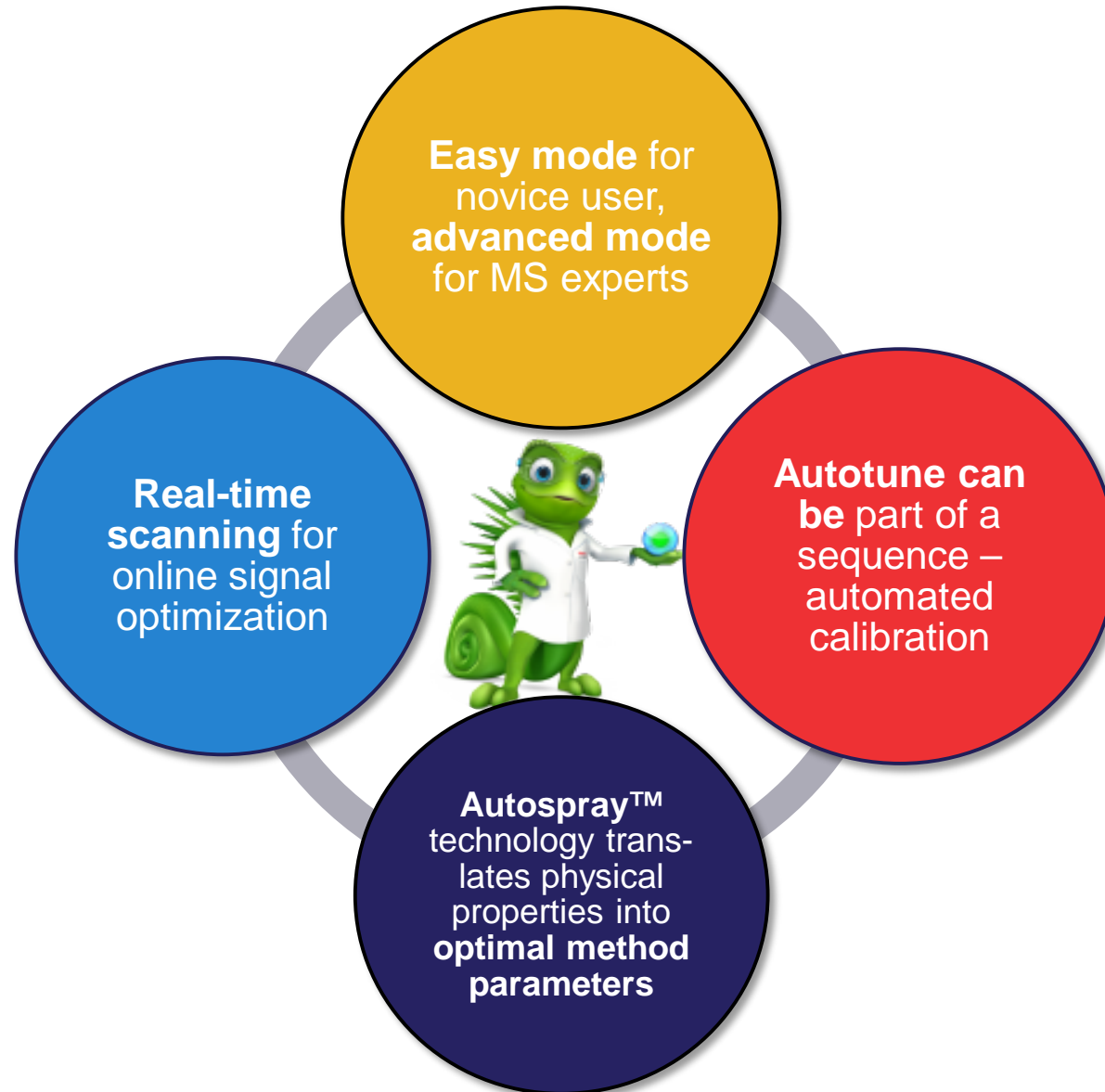


Complementary APCI ionization option for better sensitivity of selected, polar analytes

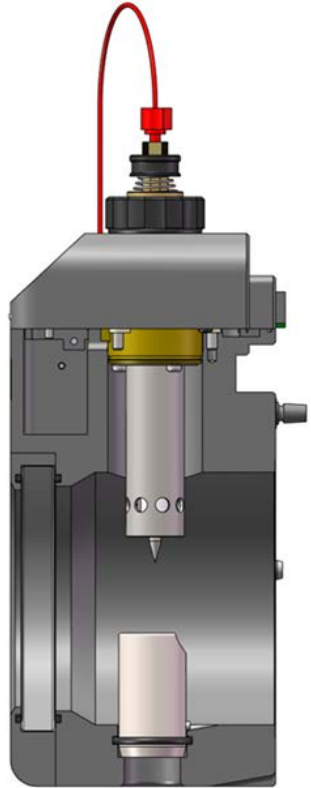
Fully Integrated Software



Embedded Control in Chromeleon Chromatography Data System(CDS)



Key Technology – Easy Source Settings with AutoSpray



VMD-Mass Detector

Use this detector

Easy Advanced

Robust Nonvolatile mobile phase Stable analyte

Sensitive Volatile mobile phase Labile analyte

Pump flow: 0.200 mL/min

Method type: Basic mode

Transfer scans

VMD-Mass Detector

Use this detector

Easy Advanced

Source settings

Vaporizer temperature: 117 °C Sheath gas pressure: 28.8 psig

Ion transfer tube temperature: 300 °C Aux gas pressure: 3.2 psig

Source voltage positive ions: 3000 V Sweep gas pressure: 0.5 psig

Source voltage negative ions: -2000 V

Method type: Basic mode

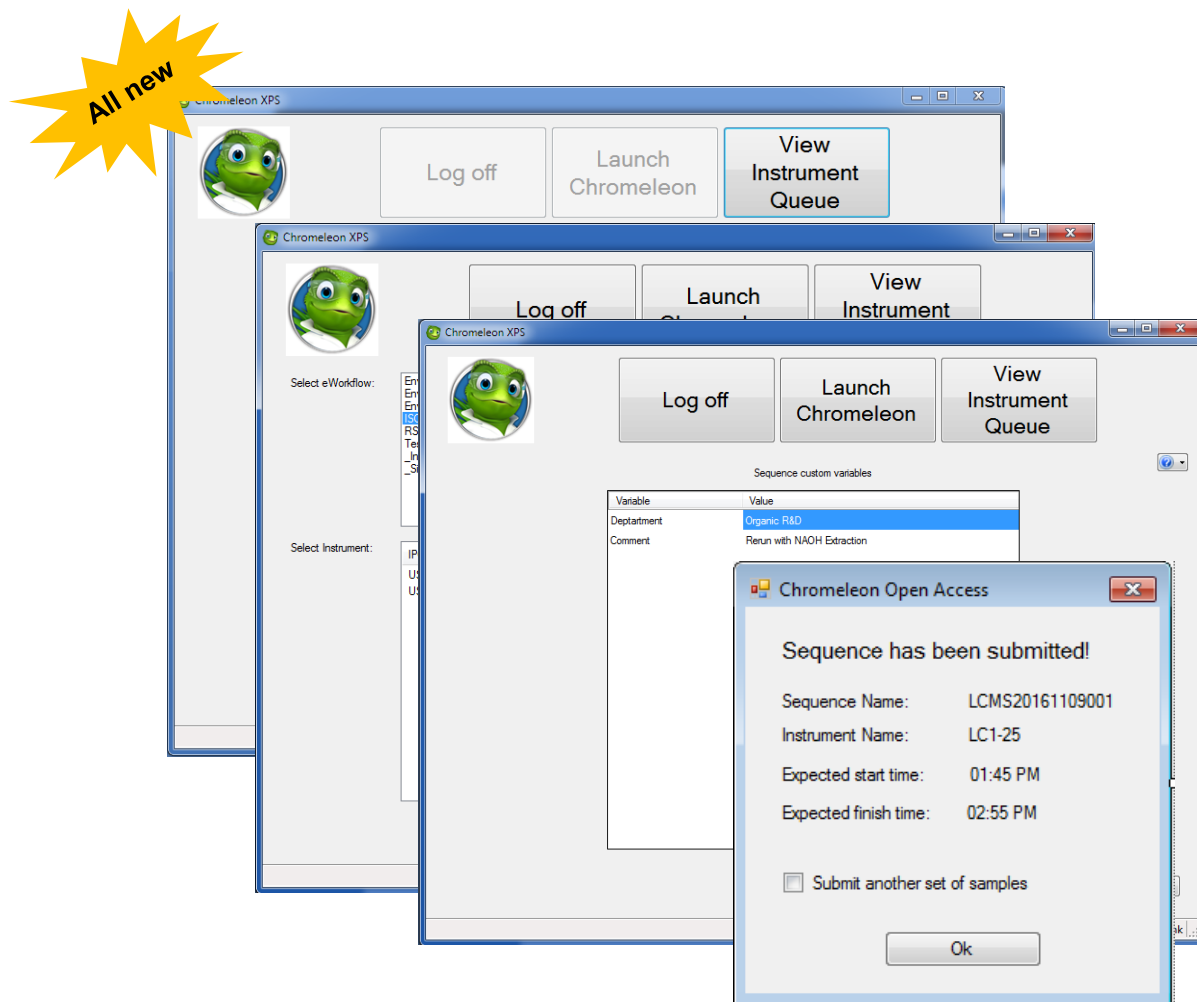
Transfer scans

- Use the sliders as a teaching tool how settings impact analyte and background noise
- Use calculated values as a good starting point for method development
- Extremely helpful to novice and expert

Making novice and expert **productive** in shortest possible time

New: Chromeleon XPS Open Access User Interface

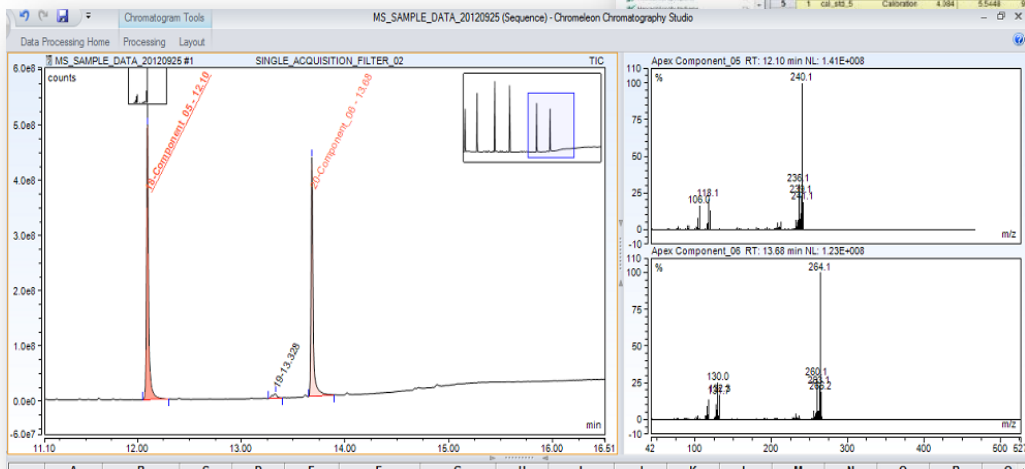
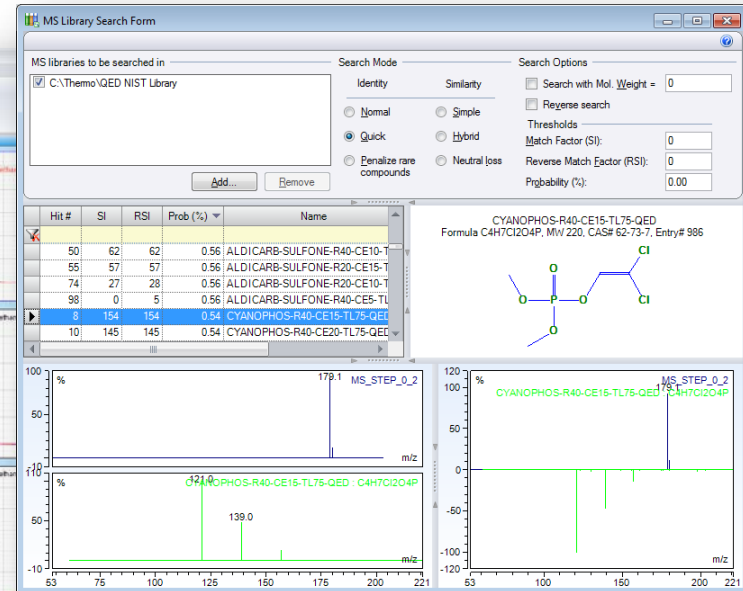
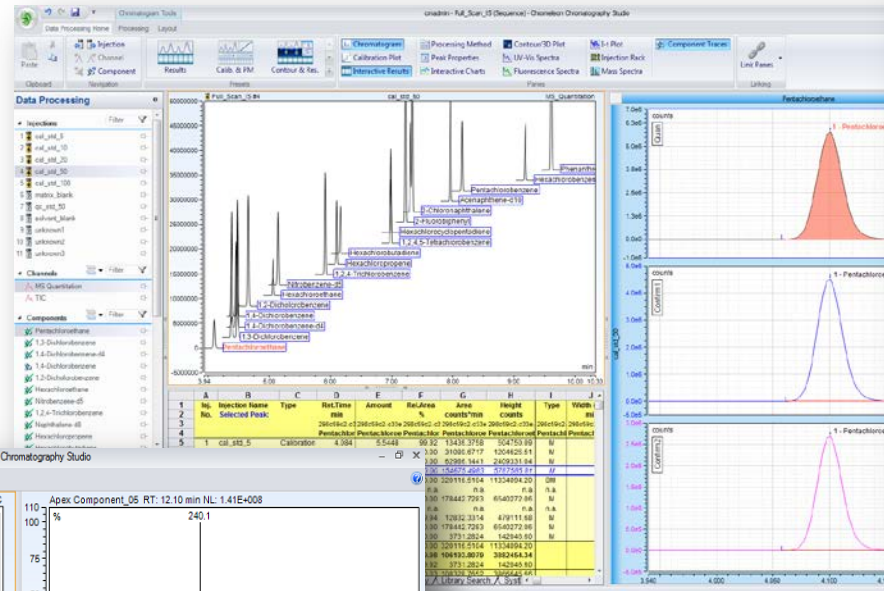
Thermo Scientific™ Chromeleon™ XPS software for multi-user, walk-up workflows (i.e. medicinal chemistry support)



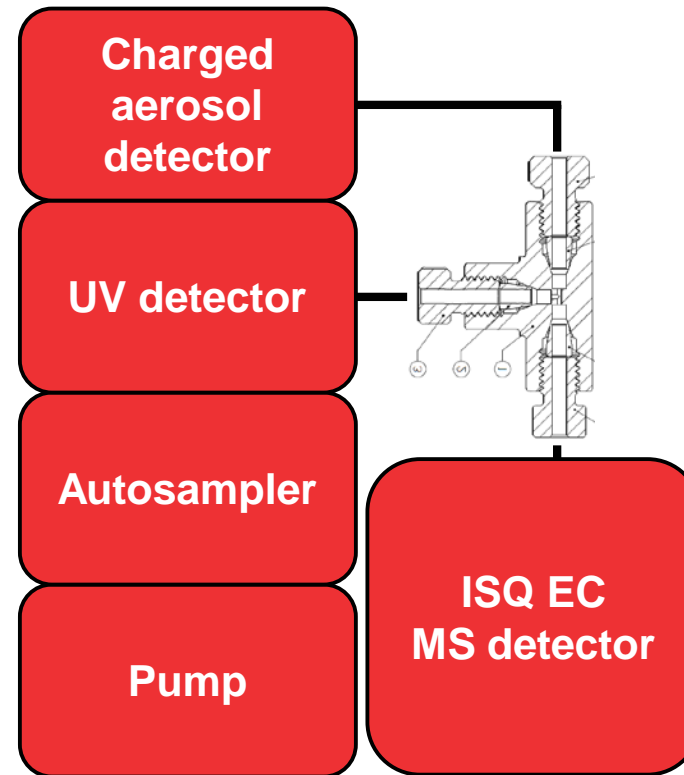
1. Log on
2. Chose method
3. Chose Instrument
4. Edit custom information (i.e. target mass)
5. Edit sample name(s)
6. Put sample in assigned sampler position
7. Run

Overall Value ISQ EC/EM Mass Spectrometers for Routine Labs

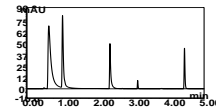
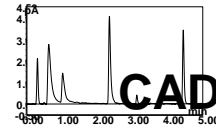
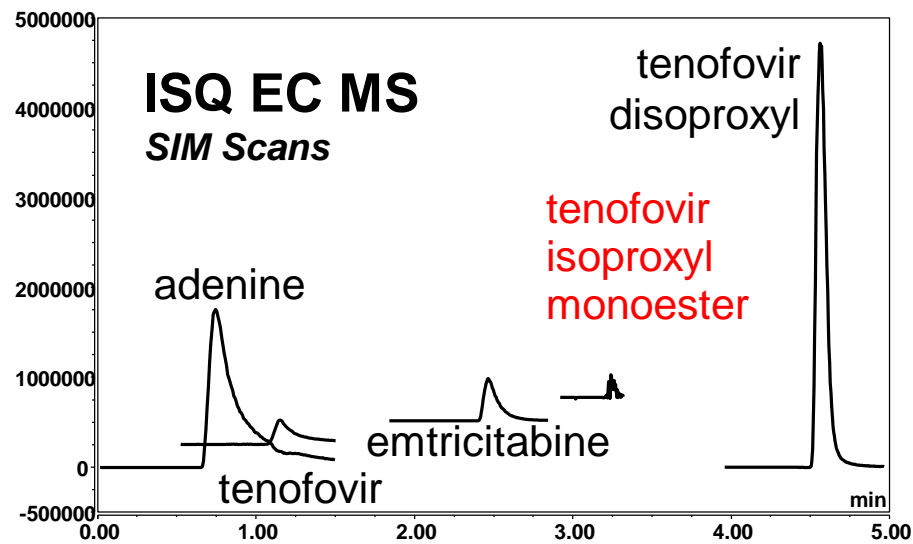
First CDS to support MS with all main front-end separation techniques (GC, LC, IC)
No compromises on data integrity or compliance



HPLC-UV-CAD-MS



HPLC-UV-CAD-MS for Tenofovir



- Identification using ISQ EC
- Quantification and determination of response factors using CAD
- UV for transfer to routine

UV

- More productive chromatography has many benefits:
 - Higher throughput > lower cost per sample and greater ROI
 - Faster sample to knowledge
 - Increased confidence in results
- Numerous new technologies introduced by Thermo Fisher Scientific in 2018 to increase chromatography productivity
- Come and talk to us about productivity solutions at **booth 16**

Separate your productivity from
the status quo.

