

Chromatography, Mass Spectrometry,  
and Lab Informatics

## Product Reference Guide



Leading analytical technologies | Applications expertise | Global support

**World-class solutions  
Transform your science**

**thermo**scientific

Thermo Scientific brand products bring leading capabilities in ion chromatography (IC), liquid chromatography (LC), gas chromatography (GC), mass spectrometry (MS), sample preparation, inductively-coupled plasma mass spectrometry (ICP-MS), discrete analyzers (DA), and software to the industry's leading portfolio, creating new possibilities for scientific analyses and providing solutions to challenging analytical problems in diverse areas, including critical applications in environmental protection and those in life sciences.

The following pages illustrate the range, scope, and excellence of our combined offerings, where you'll find the best of separation science meeting the leading mass spectrometry solutions to help move your science forward.

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Leading  
Instruments



Optimized  
accessories



Informative  
software

# new discoveries.

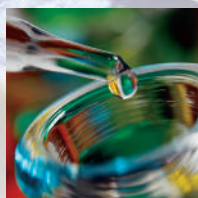
## Liquid Chromatography

Leading LC, UHPLC, and nano-LC systems



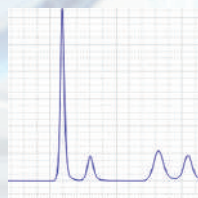
## Gas Chromatography

Our portfolio of GC, GC-MS, and GC-MS/MS solutions



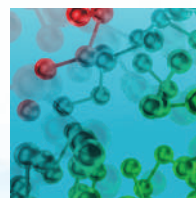
## Ion Chromatography

Standard, reagent-free IC and capillary IC systems from the world-wide leader



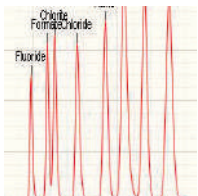
## Mass Spectrometry

Systems for precise identification and quantification



## Chromatography, MS and LIMS Software

Faster data interpretation and information flow



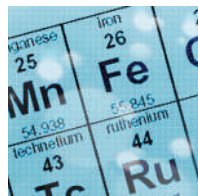
## Sample Preparation

Better extractions in less time



## ICP-MS

Outstanding productivity and greater confidence



## Discrete Analyzer

Automated Photometry DA systems for fast and effective testing and quality monitoring



Knowledgeable  
method  
development



Timely  
service



Unsurpassed  
commitment



Solvent extractions that normally require labor-intensive steps are automated and performed in minutes, with reduced solvent consumption and reduced sample handling using Thermo Scientific™ Dionex™ ASE™ 350 Accelerated Solvent Extraction and Thermo Scientific™ Dionex™ AutoTrace™ 280 Solid-Phase Extraction systems. The Dionex ASE 350 system is dramatically



**Dionex ASE 150 System**

**Dionex ASE 350 System**

The Dionex ASE system is a proprietary technique for the extraction of analytes from solid and semisolid sample matrices using common solvents at elevated temperatures and pressures. Compared to techniques such as Soxhlet and sonication, the Dionex ASE system generates results in a fraction of the time.

**Benefits:**

- Extractions for sample sizes 1–100g in minutes
- Dramatic reduction in solvent usage
- Corrosion-resistance components
- Approved for use by the U.S. EPA and CLP Program
- Walk away automation for unattended operation

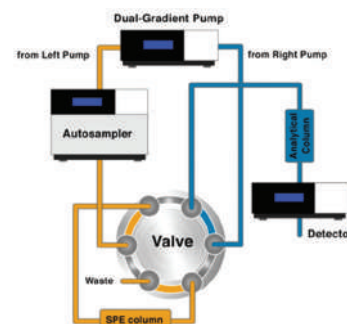


**Dionex AutoTrace 280 SPE Instrument**

The Dionex AutoTrace 280 SPE instrument performs automated solid-phase extractions (SPE) of large-volume liquid samples for organic analysis. Liquid – liquid extractions that normally take hours can be automated using a Dionex AutoTrace 280 SPE instrument.

**Benefits:**

- Automated extractions for liquid sample sizes of 20 mL–4 L
- Dramatic reduction in solvent usage and reduced sample handling
- Approved for use by many government agencies
- Extraction of six channels simultaneously



**Automated On-line SPE-LC**

A solution kit for the Thermo Scientific™ Dionex™ UltiMate™ 3000 x2 Dual HPLC systems provides fully automated on-line solid-phase extraction (SPE) for high-sensitivity analysis from even complex matrices. Samples are injected directly onto an SPE column, the matrix is removed, and the enriched analyte transferred to an analytical column.



**Reacti-Therm™ Heating and Stirring Modules**

Perform derivatization and other small-scale reactions reliably and with ease using the Thermo Scientific™ Reacti-Therm™ Heating and Stirring module. This module has dry block heaters that provide uniform, stable heating between 10–200 °C. The Reacti-Therm heater/stirrer is available in four models—single block and triple block sizes with either heat-only or heat-and-stir capability. This versatile system is compatible with a range of interchangeable accessories, for applications on small samples for a range of applications.

# more efficient Sample Prep Systems

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faster than Soxhlet, sonication, and other extraction methods, and requires significantly less solvent and labor. Accelerated solvent extraction methods are accepted and established in the environmental, pharmaceutical, food, polymer, and consumer product industries. Accelerated solvent extraction methods are accepted and used by government agencies worldwide.



## Rocket Evaporator System

The Thermo Scientific™ Rocket™ Evaporator System is a revolutionary solvent evaporator for use in laboratories seeking to spend minimal time and effort to process multiple samples for analysis. It can dry or concentrate up to six 450 mL flasks, or 18 ASE vials. This enables the user to focus on other tasks, confident that the Rocket Evaporator system will achieve perfect, reproducible results every time.

### Benefits:

- Vacuum and centrifugal evaporation for controlled evaporation and minimized sample loss
- ASE and AutoTrace compatible vessels reducing solvent handling
- End point detection
- Superior solvent recovery



## IC Sample Preparation Solutions

Products include solutions for IC sample preparation with AutoPrep and Reagent-Free Ion Chromatography – Electrolytic Sample Preparation (RFIC-ESP).

**AutoPrep** automatically prepares calibration curves and performs sample analyses. Unique plumbing configurations and automated valve operations simplifies trace level analysis.

**RFIC-ESP** systems enable a range of automated sample preparation techniques using proprietary electrolytic devices to reduce cost and provide higher value analyses.

**RFIC-ESP** devices and techniques can remove cations from an anion sample before analysis or neutralizing a strongly acidic or basic solution.



## Sample Preparation Accessories

The Thermo Scientific™ Dionex™ InGuard™ inline and Thermo Scientific™ Dionex™ OnGuard™ II offline cartridges remove matrix interferences such as phenolics, metals, cations, anions, or hydrophobic substances encountered in many ion chromatography applications.

**Dionex OnGuard II Cartridges:** Remove matrix interferences such as phenolics, metals, cations, anions, or hydrophobic substances, for better performance in many IC applications.

**Dionex InGuard Cartridges:** This line of sample pretreatment cartridges removes matrix interferences such as cations (including transition metals), anions, or hydrophobic substances encountered in many IC applications.

**Thermo Scientific™ Dionex™ SolEx™ Solid Phase Extraction Cartridges:** Offers a variety of chemistries and sizes to fit your needs.



UHPLC delivers important benefits – faster runs, better resolution, and lower operating costs. The Thermo Scientific liquid chromatography platform is the most complete LC solution provided by a single chromatography powerhouse.



### Vanquish Duo UHPLC System

Thermo Scientific™ Vanquish™ Duo UHPLC Systems support three workflows (Dual LC, Tandem LC or LC-MS, and Inverse Gradient) by combining two flow paths in one integrated UHPLC solution. These workflows improve your productivity by saving time, reducing cost per sample, increasing capacity without added bench, and using your resources more efficiently. Vanquish Duo UHPLC Systems expand the benefits of the Vanquish platform without compromising performance, robustness, or ease-of-use.

#### Three supported workflows. Two flow paths. One integrated system.

- Increase your sample throughput
- Free up valuable bench space
- Enhance qualitative and quantitative sample knowledge
- Reduce your cost per sample
- Streamline your workflow using intelligent software tools



### Vanquish Horizon UHPLC System

Designed with innovative technology and fine detail, the Thermo Scientific™ Vanquish™ Horizon UHPLC System delivers a new standard in high-end UHPLC—more results with better separations and easier interaction simultaneously, without compromise.

The Vanquish system offers:

- Up to 1517 bar of pump pressure and flow rates up to 5mL/min
- Better Separations—Separate more peaks than ever before. Vanquish UHPLC applies the most advanced technologies for all of your critical separations
- More Results—Regain time during your projects. Vanquish UHPLC improves analysis speed, increases sample capacity, and has improved robustness
- Easier Interaction—Vanquish UHPLC has an optimized design and automation features and works with the operational simplicity of the gold standard Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System software



### Vanquish Flex System

The Vanquish Flex UHPLC system expands the capabilities of the Vanquish platform by adding state-of-the-art quaternary solvent blending and versatile detection options, along with advanced speed, resolution and sensitivity, allowing users to perform biocompatible analysis for high quality and consistent data.

The Vanquish Flex system offers:

- Up to 1034 bar of pump pressure and flow rates up to 8 mL/min
- 4 solvent channels for quaternary solvent mixing
- Intelligent sample pre-compression for excellent injections up to 100  $\mu$ L in 0.01  $\mu$ L increments
- Versatile detection options including DAD, CAD and FLD

# more versatile UHPLC for all applications

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## UltiMate 3000 Standard LC Systems

The UltiMate 3000 Standard LC systems provide the right solution for demanding, analytical, and semipreparative LC applications.

- 620 bar maximum pressure and 100 Hz detectors for UHPLC compatibility
- Biocompatible version available (up to 350 bar)
- x2 Dual standard systems for ultimate productivity solution

The dual system makes it easy to configure Online-SPE, Orthogonal, Parallel or Tandem separations, Inverse Gradient operations and Fast Application Switching. With its two fully integrated, independently operating gradient pumps and smart column switching, you can configure your system to maximize throughput, resolution, or sensitivity.



## Vanquish Core HPLC System

Eliminate disruptions to your routine analytical work with the Thermo Scientific Vanquish Core HPLC systems. No matter which systems you currently use, switching to Vanquish Core is simple and seamless. Empower your operators to deliver more productivity with less work.

- Improved system productive time through rugged design and self-awareness to reduce unexpected interruptions
- Seamless method transfer from all common HPLC systems with dedicated hardware and software capabilities
- Simple integration into existing infrastructure by enabling control under Chromeleon CDS systems
- Improved personnel satisfaction through intuitive operation and maintenance support



## UltiMate 3000 Rapid Separation LC Systems

The UltiMate 3000 Rapid Separation LC (RSLC) systems integrate unique hardware features for ultrafast separations and excellent resolution using columns with small particles. In addition, they are characterized by a maximum level of reliability and flexibility.

- Binary or quaternary systems for both UHPLC and conventional HPLC applications
- Extensive flow-pressure-footprint for ultrafast, ultrahigh-resolution separations
- Column pressures up to 1000 bar
- x2 Dual RSLC systems for ultimate productivity solutions
- Bio RSLC option also available for a completely biocompatible workflows



Thermo Scientific LC modules integrate innovation and intelligent features into a broad selection of autosampler, injector, pump, flow-control, thermostatted column compartment, and detector modules. We offer a wide variety of LC and Bio columns for any analytical application, as well as accessories for use with our HPLC systems.



### UltiMate 3000 Pumps

The UltiMate 3000 pump family offers the most complete choice in the industry. From nano LC to rapid separation applications, from conventional applications to UHPLC, the UltiMate 3000 pumps always provide industry-leading flow, pressure, and precision.

**Isocratic:** Analytical

**Binary:** RSLCnano, Analytical, RSLC

**Quaternary:** Micro, Analytical, RSLC

**Dual-Gradient:** Micro, Analytical, RSLC



### Samplers and Column Compartments

The UltiMate 3000 autosamplers ensure reliable, precise, and accurate injections of nL to mL sample volumes, with extremely low carry-overs. Fraction collection options range from simple collection to advanced collection-reinjection workflows such as automated offline 2D-LC.

**Autosamplers:** Split-Loop, Pulled-Loop with integrated column compartment

**Fraction Collectors:** Fraction Collector, Autosampler/Fraction Collector, MALDI Spotter

**Column Compartments:** Integrated Switching Valves

# Detectors, Accessories and Supplies

## more comprehensive UHPLC

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### Detectors

**Optical Detectors:** Thermo Scientific optical detectors are available for UV-vis absorbance, fluorescence, and refractive-index detection of a wide variety of analytes.

**Charged Aerosol Detectors:** Thermo Scientific charged aerosol detectors provide universal detection of any non-volatile analyte and many semivolatile compounds, with or without chromophores. Detectors are available for both the Vanquish UHPLC system and the UltiMate 3000 platform.

#### Electrochemical Detectors:

Thermo Scientific Dionex UltiMate 3000 ECD-3000RS Electrochemical Detector offers easy, direct measurement to femtogram levels in very limited sample volumes with minimal preparation. It readily eliminates matrix interferences to enhance selectivity. Users have a choice of both coulometric and amperometric sensors for extremely selective analyses using microbore to normal bore columns for both HPLC and UHPLC. This is the only electrochemical detector compatible with gradient chromatography.



### ISQ EC / ISQ EM Single Quadrupole Mass Spectrometer

The new, easy-to-use Thermo Scientific™ ISQ™ EC Single Quadrupole Mass Spectrometer seamlessly integrates with ion chromatography (IC) and high performance liquid chromatography (HPLC) systems. Both novices and experts alike can quickly master MS to gain more insights from every sample.

**Gain more insights:** Higher sensitivity and more accurate quantization with Chromatographic peak mass confirmation, eliminating false negatives and false positives.

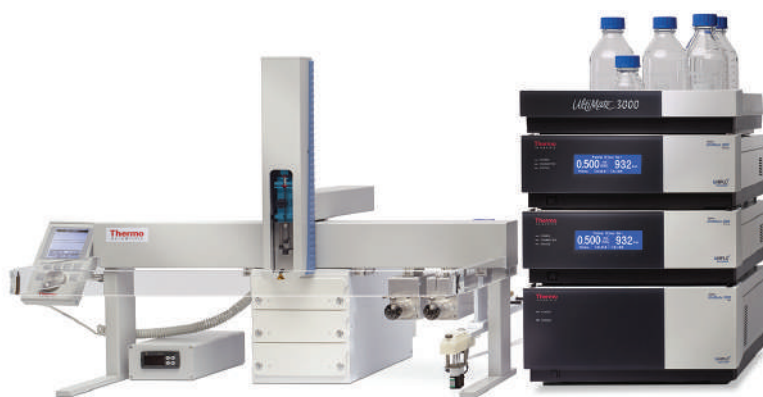
**Resolve complexity:** Improved resolution of analytes in complex matrices with better selectivity and ability to resolve co-eluting peaks using their mass-to-charge ratio.

**Easily mastered:** Save time spent on user training with integrated tools to help master MS. Experience hassle-free, seamless integration with your IC or LC system and save time using the Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software for data analysis, which also has embedded control of the ISQ EC MS.

The new, easy-to-use ISQ™ EM Single Quadrupole Mass Spectrometer seamlessly integrates with LC systems for reliable, robust, and easy LC-MS routine analysis with an extended mass range for more flexibility. Detect and quantify a variety of analytes by choosing to use either heated electrospray ionization (HESI) or atmospheric pressure chemical ionization (APCI). Integrated software allows both novices and experts to quickly master MS to gain more insights from every sample.



The leader in LC-MS innovation provides additional liquid chromatography solutions for a range of dedicated analytical needs. Whatever your requirements, Thermo Scientific LC, UHPLC, nano-LC, and LC-MS systems deliver the performance your laboratory demands.



### Transcend II System with Multiplexing and TurboFlow Technology

The Thermo Scientific™ Transcend™ II system, now equipped with high-performance UltiMate 3000 RSLC pumps, combines Thermo Scientific™ TurboFlow™ technology for online sample cleanup of complex matrices with automated 2X or 4X multiplexing for unparalleled sample throughput in an LC system.



### Prelude SPLC System

Practical, cost-effective LC-MS analysis is now ready for clinical research and forensic toxicology labs. The Thermo Scientific™ Prelude SPLC™ Sample Preparation and Liquid Chromatography system enables fast, reproducible, and reliable online sample preparation with high-performance chromatographic separation.



### VeriSpray PaperSpray Ion Source

Improve turnaround time, reduce cost per test and minimize sample preparation with the Thermo Scientific™ VeriSpray™ PaperSpray ion source, a fully automated, high-throughput, direct ionization technique used with our newest Thermo Scientific™ TSQ triple quadrupole mass spectrometers. The VeriSpray system is fully integrated into instrument control software and application-specific software, and it is capable of running proprietary VeriSpray PaperSpray sample plates, for single or high-throughput applications.



### ZipChip Interface

Integrate capillary electrophoresis (CE) and electrospray ionization (ESI) into a single microfluidic device to rapidly prepare, separate, and electrospray biological samples directly into a mass spectrometer (MS). The portable size ZipChip Interface directly mounts onto select models of Thermo Scientific™ mass spectrometers, and creates a seamless CE/ESI-MS workflow that offers fast CE separation, nano-spray level sensitivity, and HRAM spectrometry for the characterization of intact proteins, antibody drug conjugates, antibody subunits, peptides, and metabolites.

## more dedicated nano LC systems

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### UltiMate 3000 RSLCnano Systems

The UltiMate 3000 RSLCnano systems optimize low flow separations and facilitate easy coupling to mass spectrometry to provide the best resolution, sensitivity, and selectivity for nano LC and proteomics applications.

- Ideal for analysis with limited sample amounts
- High sensitivity to allow detection of femtomoles or even lower
- Maximum robustness and repeatability for consistent results
- Increased resolution and selectivity for more reliable identification
- Widest nano/cap/micro flow range from 20 nL/min up to 50  $\mu$ L/min



### EASY-nLC 1200 System

Get simplicity and high-throughput capacity in a nano-flow UHPLC. The new Thermo Scientific™ EASY-nLC™ 1200 system is optimized, fully integrated and designed for users at any level of expertise. A pressure rating of 1200 bar provides reduced cycle times and increased throughput. New maintenance-free ceramic valves, tool-free connections (Thermo Scientific™ nanoViper™ Fingertight Fittings) and new software features gives you intelligent system maintenance, results in less system downtime, lower cost of ownership, reliable and fast connections for a robust, and an easily serviceable system ultimately leading to better MS data.



Environmental, food safety, toxicology, and forensic gas chromatography applications are more demanding than ever. Our portfolio of GC, GC-MS, and GC-MS/MS systems is geared to meet the challenge.



**TRACE 1110 Gas Chromatograph**

The Thermo Scientific™ TRACE™ 1110 GC is a new multi-channel, high performance, robust gas chromatograph offering up to four injectors and four detectors allowing users to efficiently switch between different applications on the same GC. TRACE 1110 is a world class GC, offering advanced accessories. This winning quality GC is capable of easily handling routine and challenging applications in the most cost effective way.



**ISQ 7000 Single Quadrupole GC-MS System  
coupled with Triplus 500 HS**

Designed to satisfy routine laboratories evolving analytical needs, the Thermo Scientific™ ISQ™ 7000 Single Quadrupole GC-MS system offers extended uptime and robustness to maximize sample throughput, along with routine easy-to-use smart tools to simplify operation and speed up instrument familiarization. Featuring a range of configurations at different level of performances, the ISQ 7000 GC-MS is a flexible fit-for-purpose platform, fully upgradable from base to advanced highly sensitive configuration to boost performance when needed and ready-to-fit with continuous changing in regulations. Acquire industry leading sensitivity and robustness with the new Advanced EI (AEI) ion source, which features a highly efficient ionization of analytes and a more tightly focused ion beam.



**TRACE 1300 Series GC Gas Chromatographs + AI/AS 1310 Series Autosampler**

Developed around key innovations driven by customer needs, including user-installable instant connect injectors and detectors, unique and patented solutions to conserve helium carrier gas while running analyses, and optimized and miniaturized electronic components, the compact Thermo Scientific™ TRACE™ 1300 Series GC system is extremely fast, easy to use, and delivers high lab productivity at a much reduced cost of ownership. The new high-capacity TRACE 1310 auxiliary oven has multi-valve, multi-column capacity and enables the use of up to four conventional detectors simultaneously.

Thermo Scientific™ AI/AS 1310 Series Autosampler will help you process more samples more quickly with its advanced design and usability features which improve the consistency and quality of your gas chromatography (GC) results.

Choice of Detectors: Flame Ionization Detector (FID), Thermal Conductivity Detector (TCD), Electron Capture Detector (ECD), Nitrogen Phosphorus Detector (NPD) and Flame Photometric Detector (FPD)

# more productive GC and GC-MS Systems

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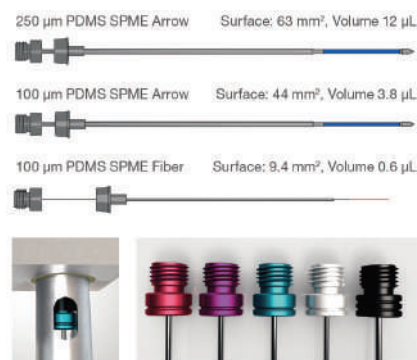
**TSQ 9000 GC-MS/MS System  
coupled with TriPlus RSH**

Satisfy your routine laboratory's current and future analytical needs for truly unstoppable performance with the Thermo Scientific™ TSQ™ 9000 triple quadrupole GC-MS/MS system. Deliver high sensitivity for more routine analysis. Minimize maintenance intervals with routine-grade robustness. Operate with technology, flexible method development and powerful reporting tools designed for optimal productivity. Achieve quality results on time, every time with easy-to-use routine workflows. Fully upgrade from base to advanced configurations to boost flexibility and performance when you need it.



**Exactive/Q Exactive HRAM  
GC Orbitrap System**

The Thermo Scientific™ Q Exactive™/Exactive™ GC system represents the first ever combination of high-resolution gas chromatography and high-resolution, accurate-mass (HRAM) Orbitrap mass spectrometry. This easy-to-use system provides the most comprehensive characterization of samples in a single analysis for the highest confidence in compound discovery, identification, and quantitation. Building upon the flexible modularity of the TRACE 1300 Series GC system, including user-exchangeable injectors and detectors, the Q Exactive/Exactive GC system has the quantitative power of a GC triple quadrupole MS combined with the high precision, full scan high-resolution, accurate-mass capability that only Orbitrap technology can offer.



**SPME Arrow  
(Solid Phase Micro Extraction)**

Solid Phase Micro Extraction is a solvent-free technique that couples sample extraction and enrichment in a single step. A thin fused-silica fiber coated by an organic phase extracts and concentrates the analytes by ab- or adsorption and desorption processes from liquid, solid and gaseous matrices. The fiber is successively thermally desorbed into a GC injector and the analytes are transferred to the analytical column.



**DFS Magnetic Sector GC-HRMS System**

The Thermo Scientific™ DFS™ magnetic sector GC-HRMS system is the gold standard in dioxin and POPs analysis. It offers worldwide full compliance with any official dioxin, PCB, or PBDE method (EPA 1613, 1668, 1614, etc.). The DFS system is the highest performing mass spectrometer ever built for target compound analysis. Its large-volume ion source offers the highest available dioxin sensitivity at maximum robustness, resulting in the best dioxin installation spec on the market: 20 fg 2378-TCDD gives a signal-to-noise ratio  $\geq 200:1$  (PtP, 4s). A product based on 50 years of experience in developing magnetic sector MS, the DFS system has all the performance you need in a package that will even fit in a small laboratory.

Discover the most comprehensive array of chromatography solutions available, from sample preparation to sample handling to GC and LC columns. Our innovative products help deliver workflow efficiencies, improved sample security, and innovative column chemistry solutions that meet the world's changing requirements.



### Thermo Scientific Sample Preparation Solutions

A range of products using innovative technologies for your analytical needs.

**SOLAμ™ Plates:** Offering cleaner, highly reproducible, and robust sample extraction at very low sample volumes.

**SOLA™ Cartridges and Plates:** Maximizing reproducibility while delivering clean and consistent extractions.

**QuEChERS-Dispersive SPE:** Efficient pesticide sample preparation from food matrices.



### Thermo Scientific Sample Handling Solutions

Ensure sample integrity with a comprehensive range of solutions to meet all application demands.

- SureStop™ Vials and Advanced Vial Closure System (AVCS)
- Certified Vial Kits
- MS Certified Vials
- Micro Sampling Options
- Headspace Vials
- High Recovery Vials
- Tools and Accessories



### Thermo Scientific BioLC Columns

**Nano Columns:** A wide range of dedicated Acclaim™ PepMap™ nano columns with zero-dead-volume connections and EASY-Spray™ integrated column emitter devices.

**Rapid Separation LC Columns:** Acclaim RSLC columns for ultimate speed and resolution in UHPLC.

**Mixed-Mode Columns:** Includes unique chemistries with tunable selectivities for charged and non-charged analytes.

**Bio Columns:** A wide range of polymeric chemistries and a unique monolith technology for the separation of biomolecules.

### Thermo Scientific SMART Digest Kits



Biomarker and biotherapeutic characterization and quantitation just got a lot easier. Use the Thermo Scientific™ SMART Digest™ and SMART Digest Immunoaffinity (IA) kits for protein sample preparation that is fast, simple, highly reproducible, and sensitive.

A significant advance in sample preparation for biopharmaceutical protein research, the kits provide fast and simple protein digestion with high reproducibility, high sensitivity, and high levels of data quality in a format that's compatible with automation. The SMART Digest Kits are a significant improvement over current in-solution protein digestion technologies, which are not reproducible, have poor sensitivity, and employ protracted methodologies not amenable to automation.

# GC, HPLC and SPE more versatile Columns and Consumables

[www.separatedbyexperience.com/](http://www.separatedbyexperience.com/)

Visit the Chromatography Resource Center, an extensive and fully searchable library of chromatography columns and consumables applications.



## Thermo Scientific GC Columns and Accessories

Redefine your expectations for GC with our line of GC Columns

**TraceGOLD™** GC Columns provide a leap forward in column performance by delivering low bleed and superior inertness.

**TracePLOT™** GC Columns offer the latest innovation in PLOT column technology, providing reproducible analyses of permanent gases, hydrocarbons and solvents.

A range of proven consumables for optimum system performance. Including septa, liners, ferrules and syringes.



## Thermo Scientific GC Derivatization Reagents and Standards

Derivatization reagents for mass spectrometry, high-pressure liquid chromatography, and gas chromatography.

Reagents designed to provide selectivity and improve sensitivity.

- Derivatization and Visualization Reagents for HPLC
- GC Derivatization Reagents
- HPLC and Spectrophotometric Grade Solvents
- HPLC Ion Pair Reagents
- Other HPLC Reagents
- Siliconizing Fluids



## Thermo Scientific LC Columns and Accessories

### Accucore™ LC Column:

- Ultra performance
- 1.5, 2.6 and 4µm solid core silica
- Reinforced nuclear technology

### Hypersil GOLD™ LC Column:

- Enhanced selectivity
- 1.9, 3, 5, and 12µm ultra pure silica
- Multiple bonding phases

### Acclaim™ LC Column:

- Traditional, dedicated column & LC column with special application
- 2.2, 3 and 5µm ultra pure silica
- Innovative, unique bonding phase

### Validated for Vanquish UHPLC columns:

- High efficiency separation
- High efficiency at high flow rates
- Operating pressure up to 21,000psi/1500 bar

### Viper™ Fitting System:

- The Viper and nanoViper fitting systems eliminate problems experienced with conventional fitting systems
- Zero-dead-volume UHPLC fingertight fittings for nano/cap, micro, and analytical LC
- Compatible with virtually every type of valve and column hardware
- Flexible stainless steel or fused silica capillaries



## Thermo Scientific EASY-Spray LC Columns

Ensure robust nano and capillary flow LC-MS with Thermo Scientific™ EASY-Spray™ LC Columns. The integrated column/emitter design eliminates dead volume and is temperature-controlled for maximum reliability and performance. Rigorously tested to ensure maximum quality, these columns are designed for simplicity and ease-of-use.



Thermo Scientific Dionex IC technology has evolved over many product generations, each providing enhanced performance, greater reliability, and easier operation. Reagent-Free™ IC (RFIC™) systems eliminate daily tasks of eluent and regenerant preparation, saving time, preventing errors, and increasing convenience.



### **Dionex Aquion / Dionex Aquion RFIC Reagent-Free Ion Chromatography System**

The Thermo Scientific™ Dionex™ Aquion™ IC system is a simple, compact platform with straightforward operation for budget limited labs. This basic IC system features dual-piston pumping, electrolytic suppression, high sensitivity and set-and-forget convenience. Thermo Scientific™ Dionex™ Aquion™ RFIC™ Reagent-Free™ Ion Chromatography system provides a high-performance foundation for ion chromatography (IC) analysis by fully integrating reagent free eluent generation (RFIC-EG) technology. The Dionex Aquion RFIC system uses proven and reliable technologies to deliver results you can count on.



### **Dionex Integration**

Meet your routine ion analysis demands using the easy-to-use and reliable Thermo Scientific™ Dionex™ Integration™ HPIC™ system. This system performs versatile and efficient analyses through comprehensive application solutions and interactive wellness features. The Dionex Integration system's flexible detector configurations meet your analysis needs for today and tomorrow. Its high-pressure capabilities enable the use of 4µm particle size IC columns to obtain better resolution and faster results without compromising data quality. Use the system's automated eluent generation (EG) to eliminate error-prone manual eluent preparation and achieve better method reproducibility.



### **Dionex ICS-6000 Hybrid HPIC System**

Get best-in-class resolution, sensitivity, and throughput for even the most complex ICxIC (2D-IC) methods and trace level analyses. The versatile Thermo Scientific™ Dionex™ ICS-6000 Hybrid HPIC™ Systems provide faster separations without compromising resolution, thanks to its dual high-pressure channels. One channel is optimized for capillary flow rates, while the other is optimized for standard (4mm) or microbore (2mm) mode. The ICS-6000 has the gradient application capability by low pressure quaternary gradient pump or by our patented RFIC-EG technology. Choose from a wide variety of chemistries, detectors, and automation options to fit your needs.

### **Dionex ICS-4000 Integrated Capillary HPIC System**

Perform high-resolution ion chromatography quickly with the Thermo Scientific™ Dionex™ ICS-4000 Capillary HPIC™ System, which delivers both ease-of-use and high-end performance with multiple detector choices to support a wide variety of applications. The system's high-purity, electrolytically generated eluent and Dionex™ IC Capillary Cube™ cartridge consumables ensure exceptional control and reproducibility for both isocratic and gradient separations as well as months of continuous operation with minimal eluent use and waste.

## more applications IC and ICMS Systems

[thermofisher.com/IC](http://thermofisher.com/IC)

Staying the leader in IC for over 40 years requires more than having the best instruments. Thermo Scientific Dionex products encompass not only instruments, but also industry-leading automation, software, and chemistries – all of which work together to provide you with



### Autosamplers

A selection of Thermo Scientific Dionex IC autosamplers, all with metal-free flow paths, supports diverse application and budgetary requirements.

**Thermo Scientific Dionex AS-AP Autosampler:** This high-performance autosampler provides increased sample capacity, fast injection times, maximum precision, and broad application flexibility. Inject from vials and/or wellplate positions in any desired order, automate sample preparation, and deliver samples to one or two instruments.

**Thermo Scientific Dionex AS-DV Autosampler:** This economical autosampler automatically filters samples as it delivers them. It supports 5 mL and/or 0.5 mL vials, and can load sample onto an injection loop or concentrator column.

**Thermo Scientific Dionex AS-HV Autosampler:** This versatile autosampler supports a wide range of sample containers, and is ideal for applications involving trace-level contaminants in high-purity water requiring large loop injection.



### Ion Chromatography Mass Spectrometry (IC-MS)

Increase the power of IC with MS detection. Utilize mass detection when you need to ensure analytical confidence and dramatically improve the detection capability of your Thermo Scientific Dionex Integrion or ICS-6000 HPIC system. Ion chromatography with mass spectrometry (IC-MS) maximizes the ability to detect and quantify unexpected co-elutions of components and to confirm trace components. An easy-to-use, high-performance benchtop system, the Thermo Scientific ISQ EC MS system offers more information about your sample than ever before with increased sensitivity and quantitative accuracy.



comprehensive solutions to your analytical challenges. When you need an analytical solution for inorganic ions, organic acids, amines, sugars, proteins, peptides, or other challenging species, find out what we can do for you.



### Eluent Generation Cartridges (EGC)

The Thermo Scientific Dionex EGC Eluent Generation Cartridge generates high-purity hydroxide, carbonate, or methanesulfonic acid (MSA) eluents electrolytically. Stop spending time manually preparing eluents. With Dionex EGC cartridges, you just add water.



### Continuously Regenerated Trap Column (CR-TC)

Designed for eluent generators in RFIC systems, the Dionex CR-TC Continuously Regenerated Trap Columns remove all anionic or cationic contaminants in the eluent continuously and provide very low baseline drift during gradient operations.



### DRS 600 Dynamically Regenerated Suppressor

Use the Thermo Scientific Dionex DRS 600 Dynamically Regenerated Suppressor for electrolytically regenerated suppression in ion chromatography (IC) applications requiring high capacity, low noise, high backpressure resiliency and fast startup. The Dionex DRS 600 Suppressor operates in constant voltage mode as well as the traditional constant current mode. This suppressor is a fundamental component of a reagent-free ion chromatography (RFIC) system.



### Carbonate Removal Device (CRD)

The Thermo Scientific Dionex CRD Carbonate Removal Device removes carbon dioxide from the suppressed eluent stream by diffusion through the walls of a gas permeable membrane. With carbonate eluent systems, it reduces background signals to nearly the same levels as those of hydroxide eluents.



### Thermo Scientific™ Dionex™ IonPac™ Columns

At the heart of Dionex ion chromatography is a unique set of column chemistries that provide high selectivities and efficiencies with excellent peak shapes.

Designed specifically for compliance in accordance with U.S. EPA Methods (e.g. EPA 300.0 (A) & 300.1), USP monographs and Pharmaceutical applications.

**Hydroxide-Selective Anion-Exchange Columns:** For isocratic and gradient separations with a wide range of capacities and selectivities.

**Carbonate Eluent Anion-Exchange Columns:** Provides well-characterized isocratic separations for regulated drinking water and wastewater methods.

**Cation-Exchange Columns:** Available in a wide range of capacities and hydrophobicities for isocratic and gradient applications.

**Ion-Exclusion Columns:** Allows separation of weak acids-with strong acids eluting in the void.

# Chromatography and LIMS more connected Software

[thermofisher.com/chromeleon](http://thermofisher.com/chromeleon)

Our enabling software solutions include enterprise-level offerings for global deployment, as well as software designed to maximize the functionality and efficiencies of our world-class scientific instruments.



## CHROMELEON Chromatography Data System

Every laboratory is different and faces unique challenges. Therefore, we developed Chromeleon 7 series CDS.

- One chromatography data system (CDS) for all chromatography laboratories – routine, development, or research – regulated or not.
- One CDS for third party GC and HPLC instruments and all of Thermo Scientific GC, HPLC, IC, and recent GC-MS and LC-MS instruments.
- One CDS for standalone instruments, networked laboratories and multi-site enterprise deployment while keeping the same user experience.
- Automate result calculation with customizable report templates.
- Speed-up review with user defined data query and audit trail filters
- Two step sequence creation using eWorkflows, for any number of samples.
- Quick, accurate, wizard based integration with Cobra™ peak detection and SmartPeaks™ Integration Assistant for unresolved peaks.

[www.thermofisher.com/integratedinformatics](http://www.thermofisher.com/integratedinformatics)



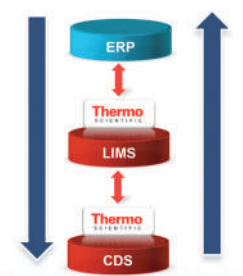
## AppsLab Library

Thermo Scientific™ AppsLab Library of Analytical Applications is a chromatographer's web-portal to our comprehensive application expertise. This open, free-of-charge repository with over 1,000 methods available today is being constantly updated with new applications.

Chromatographers can download complete applications enabling them to recreate the method on their existing hardware and chromatography data system. Having information on methods and consumables accessible in one central repository can save significant method development time.

Customers who are using our gold standard Chromeleon CDS software can download one-click workflows, including processing methods and report templates, from AppsLab Library directly into Chromeleon CDS, ready to run.

[www.thermofisher.com/appslab](http://www.thermofisher.com/appslab)



## Integrated CDS and Informatics Offering

The combination of Thermo Scientific Chromeleon CDS with Thermo Scientific Informatics solutions turns your laboratory data into actionable knowledge and provides sophisticated data process, visualization, search, and data mining tools.

Chromeleon CDS offers a digital, bi-directional out-of-the-box interface with the industry-leading Thermo Scientific SampleManager LIMS™ for a single vendor data handling and data management solution. The combination of SampleManager LIMS and Chromeleon CDS delivers a seamless integration supported by one company with integrated workflows that drive the lab process all the way from sample reception through to reporting.

Chromeleon CDS also allows you to use Thermo Scientific Data Integration Software for secure, long-term raw data archiving and scientific data management.



# Transforming Lab Informatics

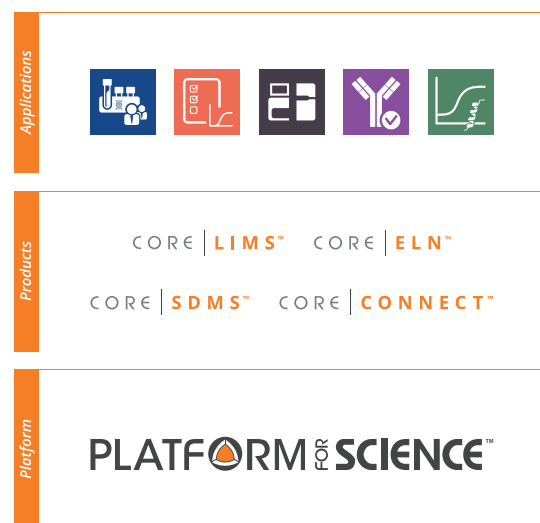
## The Digital Science Platform Approach

### Key Values Provided by Thermo Fisher™ Platform for Science™ Software

- All data lives in the same platform architecture, streamlining analysis and providing a single source of truth
- Easily add capabilities over time through apps, solution sets, and configuration – with no custom code
- Extend the platform using an industry-leading OData API to integrate with best in class tools

### The Platform Approach: Applied

The layered solution stack shows how apps and products work together while running on the same underlying code basis - the Platform for Science software.



Modular applications are available in solution sets. Applications are composable and designed for reuse, so you can rearrange the apps to fit the exact requirements of your workflows.

All of the traditional data management products you know (LIMS, ELN, SDMS) now all live on one platform...along with products for collaboration and integration between software systems.

The Platform for Science software is a flexible Platform-as-a-Service (PaaS) which underlies all products and applications. Solutions and configurations can be quickly added while allowing for organic communication between products across the platform.

### Product Summaries

| Platform for Science Software         |                                                                                                                                                                                   |
|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Thermo Fisher™ Core LIMS™ Software    | For structured data management of samples, instruments, and lab processes and workflows. Supports your unique data types and enables analysis and reporting.                      |
| Thermo Fisher™ Core ELN™ Software     | For unstructured data management. Supports compliance with regulations and guidelines such as 21 CFR Part 11, GxP, etc. Allows flexible definition of experiments & data capture. |
| Thermo Fisher™ Core SDMS™ Software    | For automated data capture of instrument files. Parses and loads data into the Platform for Science. Minimizes the need for manual intervention and protect data integrity.       |
| Thermo Fisher™ Core Connect™ Software | For communicating between software systems. Responds to external requests using our standards-based OData API. Initiates external actions using triggers.                         |

### Solutions for Your Field: Applications and Solution Sets

Application-based solution sets build on the capabilities of our products and the Platform for Science software. Solutions consist of workflow templates designed to get you up and running quickly. Pre-configured, modular apps can be combined in a variety of ways to match the workflows of your lab. The Platform for Science Marketplace solution has solutions for biologics, genomics, biobanking, and more.

## more robust LC-MS Systems

[thermofisher.com/lcms](http://thermofisher.com/lcms)

Transform your targeted quantitation. Thermo Scientific™ triple quadrupole LC-MS systems provide maximum quantitative performance and value with ultimate robustness and ease of use.



**TSQ Altis Triple Quadrupole Mass Spectrometer**

Address the most stringent analytical challenges for targeted quantitation workflows with the Thermo Scientific™ TSQ Altis™ Triple Quadrupole Mass Spectrometer, with its improved Active Ion Management (AIM™) technology, segmented quadrupoles, novel electron multipliers, and enhanced ion transmission tubes, the TSQ Altis MS helps you achieve unprecedented experimental sensitivity for all molecular species in complex matrices without sacrificing robustness.



**TSQ Quantis Triple Quadrupole Mass Spectrometer**

Easily answer critical analytical challenges during targeted quantitation workflows in your laboratory. With its segmented quadrupoles, faster rod drivers, and improved electron multipliers, the Thermo Scientific™ TSQ Quantis™ Triple Quadrupole Mass Spectrometer delivers unprecedented robustness with best-in-class sensitivity for everyday use and for every user. The TSQ Quantis MS seamlessly integrates with industry-leading quantitation softwares, HPLCs and UHPLCs, and sample preparation solutions; it also offers enhanced efficiency during targeted quantitation workflow for a wide array of molecular species.



**TSQ Fortis Triple Quadrupole Mass Spectrometer**

Increase productivity, with reliability and robustness, for labs focused on performing targeted quantitation with the Thermo Scientific™ TSQ Fortis™ Triple Quadrupole Mass Spectrometer. This system makes it easier to meet today's demands by confidently answering more complex questions per sample, while achieving reproducible results.

The TSQ Fortis MS seamlessly integrates with industry-leading quantitation software, HPLCs and UHPLCs, and sample preparation solutions; it also offers excellent quantitative performance at low dwell times which allows increased analysis of compounds per sample per day.



Versatile ion trap LC-MS systems offer unique capabilities such as  $MS^n$  and data-dependent analysis along with excellent full-scan sensitivity to provide routine detection and rapid identification of low level analytes.



**LTQ XL Linear Ion Trap  
Mass Spectrometer**

Thermo Scientific™ LTQ XL™ ion trap LC-MS mass spectrometer delivers high-sensitivity  $MS^n$  performance to generate extensive structural information for routine proteomics and metabolism applications. Its high capacity 2D linear ion trap configuration with powerful software is a complete solution for structural elucidation questions. The LTQ XL MS offers multiple dissociation techniques, PQD, ETD and CID.

- PQD is a proprietary technique that eliminates the low mass cut-off concern inherent with all ion traps
- Extensive coverage for predicted and unpredicted metabolites



**Exactive Plus Orbitrap Mass  
Spectrometer**

The Thermo Scientific™ Exactive™ Plus mass spectrometer is easy to use, cost effective to operate and, coupled with workflow-driven software, makes an ideal instrument for new users and users performing largely routine analyses. It delivers high-resolution, accurate-mass (HRAM) full-scan MS for fast, precise, and reproducible results and tremendous analytical confidence. The continuous acquisition of HRAM full-scan data allows retrospective data analysis for qualitative and quantitative analyses.

# more resolution Orbitrap LC-HRMS systems

[www.planetorbitrap.com](http://www.planetorbitrap.com)

Orbitrap technology is the recognized gold standard for high-resolution, accurate-mass (HRAM) analyses. It is available in a variety of mass spectrometry platforms. The Orbitrap Fusion MS is the ultra-high performance research instrument. The Exactive and Exploris MS family takes the advantage of Orbitrap HRAM for both qualitative analyses and routine targeted quantification to non-targeted screening.



**Q Exactive Plus Benchtop  
Quadrupole-Orbitrap Mass  
Spectrometer**

The Thermo Scientific™ Q Exactive™ Plus benchtop LC-MS/MS combines high performance quadrupole precursor selection with high-resolution, accurate-mass (HRAM) Orbitrap detection to deliver high performance and tremendous versatility. From protein characterization to targeted or DIA based quantitation and confident DMPK qual/quan screening studies, this system enables you to screen, identify, and quantify compounds in complex samples rapidly.



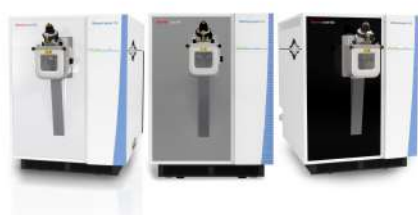
**Q Exactive HF Benchtop  
Quadrupole-Orbitrap Mass  
Spectrometer**

Identify and quantify more proteins, peptides, lipids, glycans and small molecules accurately and in less time with the Thermo Scientific™ Q Exactive™ HF hybrid quadrupole-Orbitrap mass spectrometer. The Q Exactive HF system combines a state-of-the-art segmented quadrupole for high-performance precursor ion selection with a high resolution, accurate-mass (HR/AM) ultra-high-field Orbitrap mass analyzer to deliver a superior combination of scan speed, resolving power, mass accuracy, spectral quality and sensitivity. Identify, quantify and confirm in a single analysis with a single instrument with the Q Exactive HF mass spectrometer.



**Q Exactive UHMR Hybrid  
Quadrupole-Orbitrap Mass  
Spectrometer**

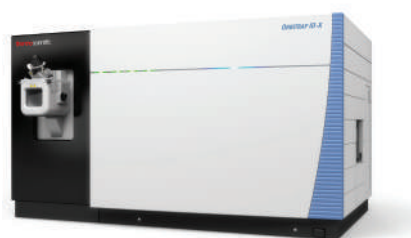
Perform the highest - quality native intact mass and top-down analysis in structural biology and biopharma research. The Thermo Scientific™ Q Exactive™ UHMR (Ultra-High Mass Range) Hybrid Quadrupole-Orbitrap™ Mass Spectrometer is the first UHMR MS to combine substantially increased sensitivity and mass resolution at high  $m/z$ , MS2, and psuedo-MS3 capabilities in a single platform.



**Orbitrap Exploris  
120/240/480 MS series**

Maximize high-throughput performance in proteomics and biopharma applications with the Thermo Scientific™ Orbitrap Exploris™ 120/240/480 MS series. Where next level exploration delivers quantifiable accuracy, and selectivity required to obtain richer insights. Empowering translational scientists by bringing performance and intelligence together, the switch between exploration and targeted quantitation has never been easier. Suddenly your work goes deeper and even the routine will become simple, certain and extraordinary.

Achieve superior selectivity and enable more proteins to be identified while reducing time-consuming sample preparation steps with the next generation differential ion mobility Thermo Scientific™ FAIMS Pro™ interface. The FAIMS Pro interface reduces chemical noise and matrix interferences, resulting in improved assay robustness and increased sensitivity. The FAIMS Pro interface offers separation based on a combination of factors, such as charge state, shape, conformation, and size of gas phase ions.



**Orbitrap ID-X Tribrid  
Mass Spectrometer**

Combining industry-leading mass analyzer technology dedicated for small molecule analysis with the Thermo Scientific™ AcquireX intelligent data acquisition strategy, the Thermo Scientific™ Orbitrap ID-X™ Tribrid™ Mass Spectrometer enables you to collect more meaningful data. By capturing more low-abundance analytes and leveraging streamlined data analysis and mass spectral prediction tools, the system's intuitive, automated workflow accelerates results to let you go beyond faster.



**Orbitrap Eclipse Tribrid  
Mass Spectrometer**

Today's cutting-edge research pushes LCMS to its limits. Obtaining high confidence insights to enable accurate resolution of subtle differences and avoid costly deadends is needed faster than ever before. The Thermo Scientific Orbitrap Eclipse Tribrid mass spectrometer surpasses these limits with new innovations that deliver the ultimate flexibility to expand experimental scope, and with built-in intelligence to ensure the highest data quality and confidence. One system provides maximum insights, so you productively go beyond today's discovery.

# Chromatography, MS and LIMS more connected Software

[www.planetorbitrap.com](http://www.planetorbitrap.com)

Our enabling software solutions include enterprise-level offerings for global deployment, as well as software designed to maximize the functionality and efficiencies of our world-class scientific instruments.



## Thermo Scientific Application-Specific Software

### Proteomics

**Thermo Scientific™ Proteome Discoverer™ software:** for comprehensive data analysis for qualitative and quantitative proteomics research.

**Thermo Scientific™ ProteinCenter™ software:** for web-based comparison and interpretation of data sets in minutes for biological information.

**Thermo Scientific™ Pinpoint™ software:** methods for easy transition from early-stage biomarker discovery to larger-scale, quantitative proteomics.

**Thermo Scientific™ ProSight PC™ software:** For top-down MS/MS protein identification and automated PTM annotation.



## Thermo Scientific Application-Specific Software

### Small Molecules

**Thermo Scientific™ Compound Discoverer™:** for small molecule identification with customizable node-based workflows, integrated compound identification capabilities, and statistical analysis.

**Thermo Scientific™ mzCloud™ Advanced Mass Spectral Database:** Thermo Fisher Scientific is proud to contribute to a cloud-based HRAM fragmentation library.



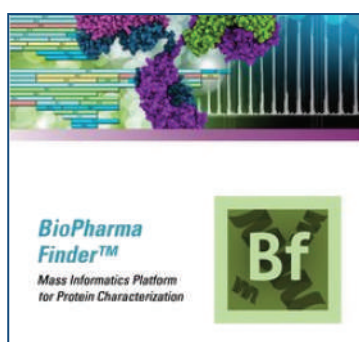
## Thermo Scientific Application-Specific Software

### Lipidomics

**Thermo Scientific™ LipidSearch™:** processes LC-MS data, including the high-resolution accurate-mass data generated by Thermo Scientific™ Orbitrap™-based mass spectrometers, to provide accurate lipid identification. It automatically integrates complex data into reports and dramatically reduces data analysis time.



Accelerate the acquisition of high-quality mass spectral data with intuitive, application-specific Thermo Scientific™ MS software, which helps turn that data into answers to the most challenging scientific questions.



### Biopharmaceutical Characterization

**Thermo Scientific™ BioPharma Finder™:** Screen, identify and characterize intact proteins with higher productivity and confidence using Intact Protein workflow. Confirm amino acid sequence, identify site and type of known/unknown PTMS while providing relative amounts using Peptide Mapping workflow.

**Thermo Scientific™ SimGlycan™:**

In combination with multistage fragmentation (MS<sup>n</sup>) this software provides the most in depth characterization of glycan structures available.



### General Screening Applications

**Thermo Scientific™ TraceFinder™:** for all GC/MS and LC/MS quantitation and screening needs, including those who need a 21 CFR Part 11 compliant environment.

**Thermo Scientific™ Compound Discoverer™:** empowers researchers to strategically collect, organize, store, and analyze data for both targeted and untargeted workflows.

**Thermo Scientific™ Mass Frontier™:** manage, evaluate, and interpret GC and LC mass spectral data.



### Clinical Research/Forensic Toxicology

**Thermo Scientific™ ToxFinder™:** for automated LC-MS/MS screening in forensic toxicology.

**Thermo Scientific iRCPro:** Ion ratio calculation software designed for Thermo Scientific TSQ MS platforms.



### Trace Elemental Software

#### Thermo Scientific Qtegra Intelligent Scientific Data Solution (ISDS)

The Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS) Software delivers quality and drives productivity. The platform is intuitive and easy to use for routine, high throughput applications, yet offers all the flexibility required for the most demanding applications. As the common ICP software platform, Qtegra ISDS Software reduces training requirements, makes adoption of new instrumentation faster and easier, and allows for increased flexibility for modern multi-technique laboratories.

# more innovation with Trace Elemental Analysis solutions

[thermofisher.com/TEA](http://thermofisher.com/TEA)

Award-winning instrumentation for fast, simple and accurate trace element identification. Across the lab we offer the broadest portfolio of instrumentation to identify organic and inorganic elements at ppm to sub-ppt levels. These breakthrough technologies enable scientists in environmental, industrial and health markets to work faster, with confidence and the flexibility to adapt to changing demands.



## **iCAP PRO Series ICP-OES**

Maximize your analytical performance in routine and research applications. The Thermo Scientific™ iCAP™ PRO Series ICP-OES delivers the sensitivity and flexibility to analyze most challenging samples. The instrument provides low-cost, multi-element analysis for measuring trace elements in a diverse sample range. A combination of high productivity, advanced performance, robustness, ease of use, and consistently reliable data, so you can ensure compliance to global regulations and standards.



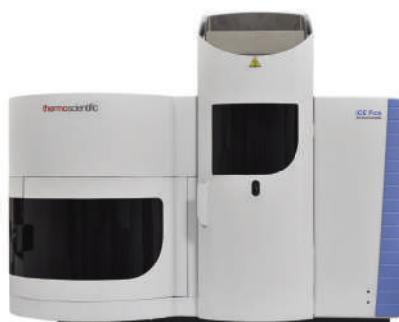
## **iCAP RQ ICP-MS**

User-inspired hardware and software combine in the Thermo Scientific™ iCAP™ RQ ICP-MS to deliver maximized productivity and robustness. Simplicity and ease-of-use work in concert to streamline work-flows and achieve 'right-first-time' results; essential to all busy labs. This innovative single quadrupole (SQ) ICP-MS is the ideal trace elemental analyzer for a wide range of sample types and industries; from 24/7 routine analysis to advanced applications in research.



## **iCE 3000 Series AAS**

Perform efficient, accurate trace elemental analysis with the Thermo Scientific™ iCE™ 3000 Series AAS. With dedicated flame, furnace, or combined flame and furnace options, these fast, easy-to-use and fully automated AAS analyzers are the ideal, low-cost solution for your laboratory requirements.



## **iCE FIOS AAS**

The Thermo Scientific™ iCE™ FIOS™ AAS incorporates a unique ten lamp carousel and fibre optics that enable the measurement of a wide range of elements, expanding your AAS analysis. The flame atomizer combined with the double beam optical system enables the analysis of elements in the concentration range of sub ppm to % level. • Easy-access ten lamp carousel with the capability to read coded lamps • High light transmission for high precision and accuracy. The iCE FIOS AAS instrument is an ideal solution for laboratories that analyze a number of elements in samples at varying concentration ranges.



**iCAP TQ ICP-MS**

Delivering research level trace elemental analysis, combined with routine ease-of-use, the Thermo Scientific™ iCAP™ TQ ICP-MS is a high-performance, future-proof ICP-MS solution. Expand your applications and enhance your laboratory efficiency with breakthrough triple quadrupole technology that is so easy to use, any analyst can operate it. Experience the benefits of research-level analysis and expand your laboratory's application portfolio, safe in the knowledge that your operators can seamlessly switch from our Single Quadrupole-ICP-MS instruments to Triple Quadrupole with Thermo Scientific™ Qtegra™ Intelligent Scientific Data Solution™ (ISDS).



**ELEMENT 2/XR HR-ICP-MS**

Gold standard in ICP-MS performance, for superior data confidence. The Thermo Scientific™ ELEMENT 2 and XR High Resolution (magnetic sector) ICP-MS systems cover the sub-ppq to ppm concentration range. They provide class-leading elimination of interferences for accurate and reliable quantitative multi-element analyses at trace levels, even without sample preparation. This makes them especially suitable for the metrology and analytical standards industry as well as semiconductor, geological, and material science laboratories. The Jet Interface for the ELEMENT 2/XR HR-ICP-MS sets a new standard in sensitivity for ultratrace elemental analysis.



**ELEMENT GD PLUS GD-MS**

Defining quality standards for the analysis of solid samples. The Thermo Scientific™ ELEMENT GD PLUS Glow Discharge Mass Spectrometer (GD-MS) redefines the analysis of advanced high-purity materials directly from the solid. Extra-low detection limits are provided with minimum calibration and sample preparation effort, making bulk metal analysis and depth profiling applications the domain for GD-MS. Ceramics and other non-conductive powders are analyzed by using a pulsed source approach, providing the same level of sensitivity and data quality. This makes GD-MS the reliable standard method for metal analysis.



### FlashSmart Elemental Analyzer

Solve more laboratory challenges, improve workflow, and minimize downtime when performing carbon, hydrogen, nitrogen, sulfur and oxygen (CHNS/O) analyses with the Thermo Scientific™ FlashSmart™ Elemental Analyzers. Based on the modified Dumas Method, the FlashSmart Elemental Analyzer is highly flexible, offering modularity that enables over 20 configurations in one instrument. Besides expanding your analytical capabilities, this analyzer features powerful software that supports automation and precise reports, making the system easier to use from start to finish.

# Isotope Ratio Mass Spectrometry

more sensitivity

[thermofisher.com/IRMS](http://thermofisher.com/IRMS)

Achieve unique information, such as origin, history, and age, from your samples with the unsurpassed precision and sensitivity in isotope ratio measurements afforded by Thermo Scientific™ isotope ratio mass spectrometers.



## Isotope Ratio Infrared Spectrometry

Utilize state-of-the-art mid-infrared spectroscopy with the Thermo Scientific™ Delta Ray™ Isotope Ratio Infrared Spectrometer (IRIS) that enables simultaneous determination of concentration,  $\delta^{13}\text{C}$  and  $\delta^{18}\text{O}$  of  $\text{CO}_2$  at ambient concentrations with a precision as low as 0.05%. This analyzer empowers you to make profound scientific discoveries in a wide variety of research fields like greenhouse gas monitoring, ecology and plant science, volcano monitoring, carbon storage, and sequestration.



## DELTA V™ Isotope Ratio MS

Measure isotopic signatures with extreme precision and sensitivity to provide the unique insight into the history and origin of compounds with Thermo Scientific isotope ratio mass spectrometry.

- Combine all isotope ratio mass spectrometry (IRMS) applications in a single analyzer. The Thermo Scientific™ Delta V™ IRMS systems combine outstanding sensitivity with excellent linearity and stability to address applications as diverse as the detection of honey adulteration by EA-IRMS to  $\delta^{13}\text{C}$  analysis of PAHs in soil with GC-IRMS.
- Get the highest sensitivity and precision for the determination of isotope ratios with the Thermo Scientific™ MAT 253™ stable isotope ratio mass spectrometer. It provides a flexible and open platform for the connection of inlet systems and preparation devices for the smallest amounts of sample in IRMS.



## High Resolution Isotope Ratio MS

Discover a new world of mass spectrometry. The Thermo Scientific™ 253 Ultra™ high resolution isotope ratio mass spectrometer revolutionizes the measurement of site-specific and clumped-isotope-ratio analysis of intact molecules. Analysts now get direct access to the conditions under which molecules were formed and how they were transported, stored, and degraded. This will enable new discoveries in climate research, biochemistry, forensics, oil, and gas exploration.



### Multicollector ICP-MS

Meet the ever-expanding application demands of earth sciences, nuclear sciences, and other fields requiring high-precision isotope ratio measurements with the Thermo Scientific™ Neptune Plus™ high-resolution multicollector ICP-MS system. The Neptune Plus system combines field-proven technology with the latest innovations. This powerful double-focusing mass spectrometer, with high mass resolution, variable multicollectors, and multi-ion counting capability, offers ground-breaking sensitivity, high dynamic ranges, unsurpassed linearity, and robust stability.



### Thermal Ionization MS

Get high-precision isotope ratio measurements of your precious samples with the Thermo Scientific™ Triton Plus™ multicollector thermal ionization mass spectrometer (TIMS). With a proven thermal ionization source and a unique variable multicollector system that can be configured to suit the application, the Triton Plus TIMS system is ideal for dating of geological samples and control of isotopic compositions of nuclear materials. It has outstanding sensitivity, dynamic range, linearity, and stability.



### Noble Gas MS

Take the next step in noble gas mass spectrometry. The new series of Thermo Scientific™ noble gas mass spectrometers gives you unsurpassed precision, sensitivity, dynamic range, linearity, and stability.

- Improve age precision in Ar-Ar dating by an order of magnitude. Get all five argon isotopes simultaneously with the Thermo Scientific™ Argus VI™ static vacuum noble gas mass spectrometer.
- Redetermine the isotope ratios of neon, argon, krypton, and xenon by unsurpassed high resolution and precision of the Thermo Scientific™ Helix MC Plus™ multicollector noble gas mass spectrometer.
- Enter new fields of research with unique subpermil precision by using the new Thermo Scientific™ Helix SFT™ split flight tube noble gas mass spectrometer.

# more productivity Discrete Analyzers

[thermofisher.com/gallery](http://thermofisher.com/gallery)

Thermo Scientific™ Gallery™ series analyzers are easy-to-use automated photometric systems that allow laboratories to simplify their testing and to increase efficiency. The discrete cell technology offers faster, reproducible results with less sample and reagent waste, providing a quick, economical solution. With the technology, low detection levels can be achieved. This self-contained system has been successfully adapted to more than 50 food and beverage and environmental applications and can simultaneously measure multiple analytes.



## Gallery / Gallery Plus

The Gallery™ analyzer provides excellence and efficiency in a bench top system. Discrete analyzers use colorimetric, enzymatic and electrochemical measurements specifically designed for food, beverage and environmental quality control and testing. Several tests can be run simultaneously offering reproducible results of up to 200 tests per hour.

The Gallery™ Plus analyzer can accommodate up to 108 samples and 42 reagents in its separated sample and reagent carousels and has the capability to run up to 350 tests per hour. First results are typically ready in as little as ten minutes. There is no reagent priming required, no risk of carry over, nor a need for an external water source.



## Gallery Plus Beermaster

The Gallery™ Plus Beermaster is specifically designed to improve productivity in a beer production facility and is dedicated to beer, wort, and malt analysis and quality control. Labor intensive bitterness testing has been automated saving time spent in sample pretreatment and analysis. Other analytes, such as beta-glucan, pH, and sulfur dioxide can be simultaneously measured from the same sample.



## System Reagents

Thermo Scientific System Reagents provide a complete solution. They are ready to use, optimized kits that save hands-on time, reduce errors, and minimize reagent waste. Bar-coded reagent bottles include volume, lot, and expiration dates providing real-time reagent monitoring. A wide range of calibration standards are available with full traceability. Standard solutions are certified and lot controlled.



Omics research is accelerating the conversion of basic scientific knowledge into potential tests, treatments, and practices that improve human, animal, and plant health. Whether you are using proteomics, glycomics, metabolomics, or lipidomics approaches, we are committed to advancing research. With our knowledgeable application scientists, innovative mass spec solutions, and key opinion leaders, we bring you the most current approaches and thinking in this field.

#### **Proteomics**

- Top-down proteomics
- Bottom-up proteomics
- PTM analysis
- Intact protein characterization
- Targeted quantitation

#### **Metabolomics**

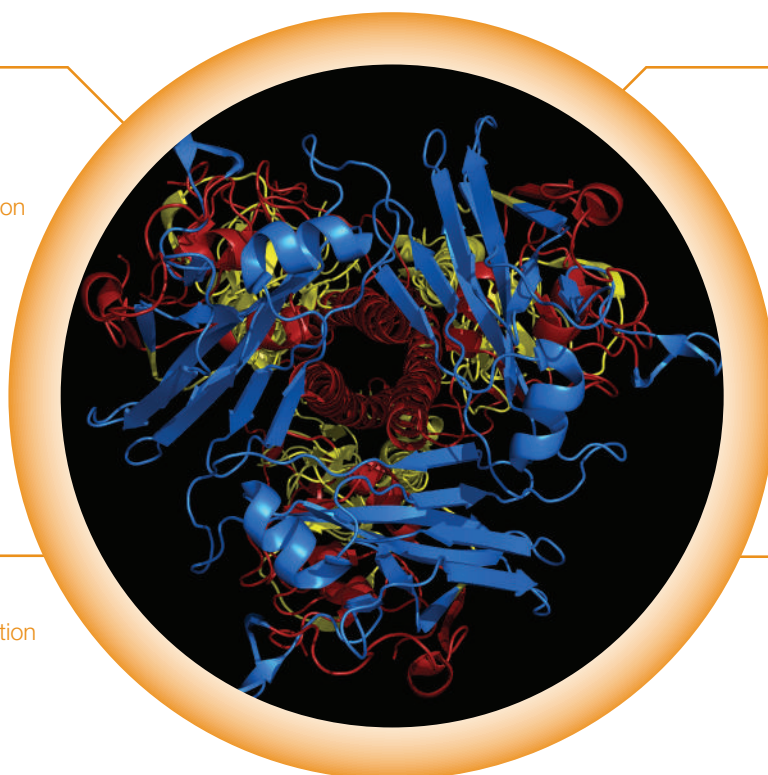
- Untargeted analysis
- Targeted analysis

#### **Glycomics**

- Intact glycoprotein profiling
- Glycan ID and characterization
- Glycan quantitation
- PTM glycosylation

#### **Lipidomics**

- Untargeted analysis
- Targeted analysis
- Shotgun lipidomics
- Lipid structural elucidation



# Transforming Your Science Omics Research Solutions

W O R K F L O W

## Sample Preparation

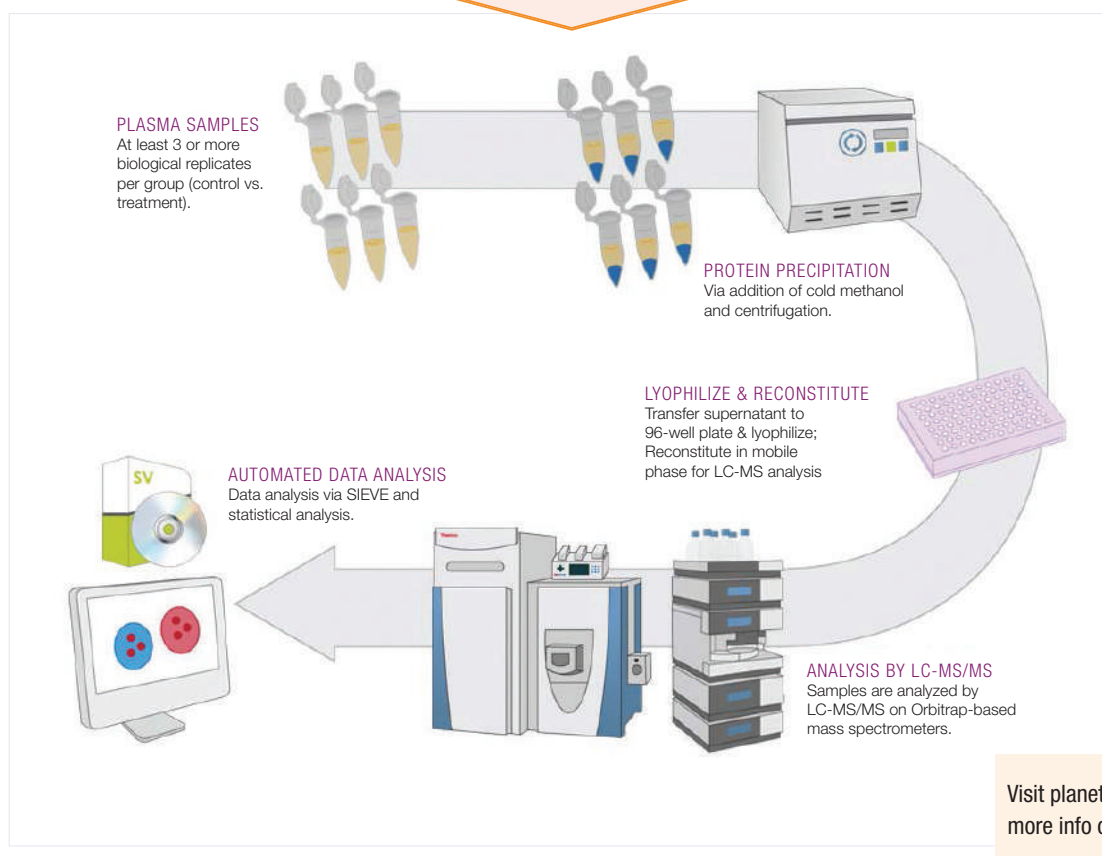
Simplify, speed up, and automate sample preparation to increase productivity and reduce the cost per sample.

## Sample Analysis

Rapidly separate, detect, and quantify complex samples with industry-leading mass spec solutions. Perform both qualitative and quantitative analyses using high-resolution, accurate-mass Orbitrap systems and SRM analyses with triple quadrupole MS.

## Data to Results

With application-specific software solutions, turn data into answers to the most challenging scientific questions.





# Thermo Scientific™ Pharmaceutical workflow enablers

## Small molecules

### Discovery DMPK

HyperSep™ SPE Cartridges and Plates  
WebSeal™ Well Plates and Mats  
Accucore™ RP-MS LC Columns  
Accucore Biphenyl LC Columns  
Acclaim™ VANQUISH™ C18 UHPLC Columns  
Titan3™ Syringe Filters

### Development DMPK / Pre Clinical

SOLA™/SOLAμ™ SPE Plates and Cartridges  
WebSeal Well Plates and Mats  
HyperSep SPE Cartridges and Plates  
Accucore C18 LC Columns  
Accucore Biphenyl LC Columns  
Hypersil GOLD™ VANQUISH™ C18 UHPLC Columns

### Clinical

SOLA/SOLAμ SPE Plates and Cartridges  
WebSeal Well Plates and Mats  
Hypersil GOLD VANQUISH C18 UHPLC Columns  
Accucore C18 LC Columns  
Accucore Biphenyl LC Columns

### QA/QC

Titan3 Syringe Filters  
Hypersil GOLD C18 UHPLC Columns  
Accucore RP-MS LC Columns  
Accucore Biphenyl LC Columns  
TraceGOLD™ GC Columns

## Large molecules

### Discovery DMPK

SMART Digest™ Kits  
WebSeal Well Plates and Mats  
MAbPac™ LC Columns  
ProPac™ Elite WCX LC Column  
GlycanPac™ LC Columns  
Acclaim 120 C18 Columns  
CX-1 pH Gradient Buffers

### Development DMPK / Pre Clinical

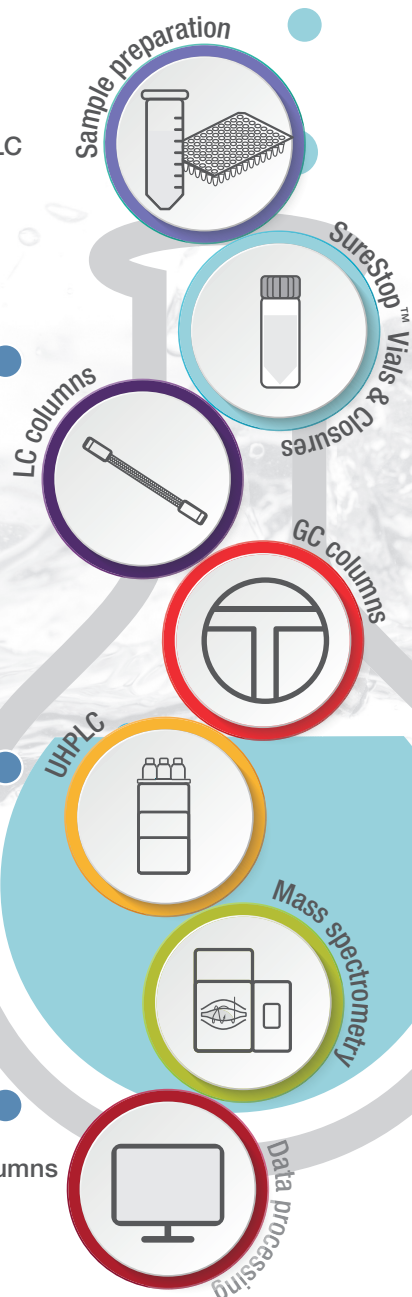
SMART Digest & SMART Digest ImmunoAffinity Kit  
SOLA/SOLAμ SPE Plates and Cartridges  
WebSeal Well Plates and Mats  
Acclaim 120 C18 Columns

### Clinical

SOLA/SOLAμ SPE Plates and Cartridges  
WebSeal Well Plates and Mats  
Acclaim 120 C18 Columns

### QA/QC

Titan3 Syringe Filters  
SMART Digest Kits  
ProPacLC Columns  
MAbPacLC Columns  
CX-1 pH Gradient Buffers  
Acclaim 120 C18 Columns



# Transforming Your Science Biopharma and Pharma

Drug  
Discovery



Drug Discovery

Drug  
Development



Drug Development

Pre-clinical and Clinical  
Drug Testing



Pre-Clinical &  
Clinical Drug Testing

Pharmaceutical  
QA and Control



Pharmaceutical QA/QC

Thermo Fisher Scientific offers a uniquely broad portfolio of platforms and solutions to meet your analytical needs, from discovery to QA/QC. Whether you are screening your clones for efficacy or undertaking a full characterization of the glycosylation patterns of your antibodies, we've got the solution. Join the community at: [thermofisher.com/pharma-biopharma.html](https://thermofisher.com/pharma-biopharma.html)

## The right platforms for your analytics

### UHPLC columns

We have the broadest possible range of columns for biologics separation and characterization, including unique, highly specific multi-mode columns such as GlycanPac.



### LC

Maximize your liquid chromatography separations with the fast, flexible, and powerful range of Thermo Scientific UHPLC systems, including the next generation Vanquish UHPLC.



### Orbitrap mass spec

Rapidly analyze highly complex proteins, such as monoclonal antibodies, with incredible detail using Orbitrap technology, the most powerful in the industry.



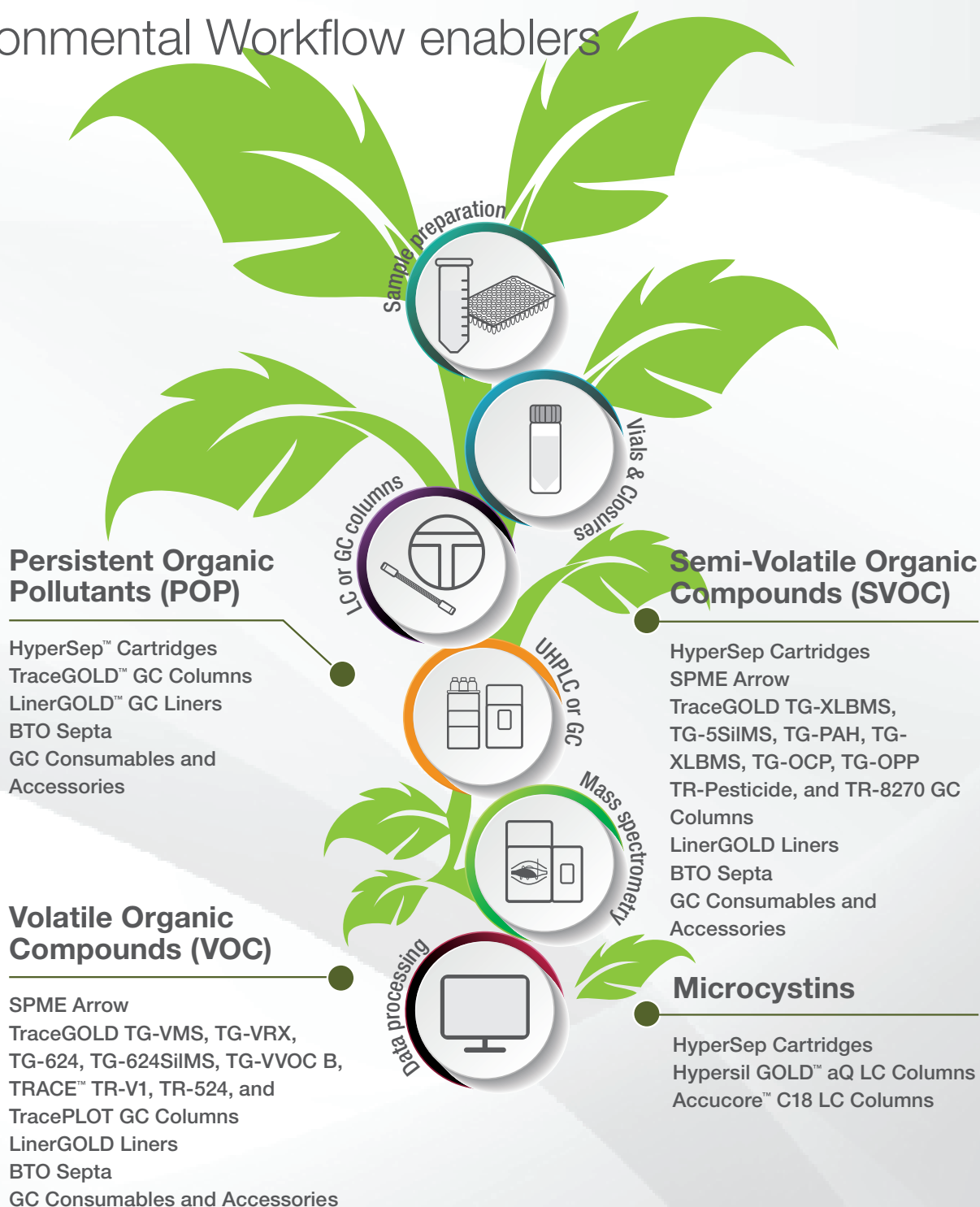
### Informatics platforms

Control your instruments and deconvolute your data using our wide range of informatics and software platforms.





# Thermo Scientific™ Environmental Workflow enablers



# Transforming Your Science Environmental Analysis

## W O R K F L O W

### Sample Preparation

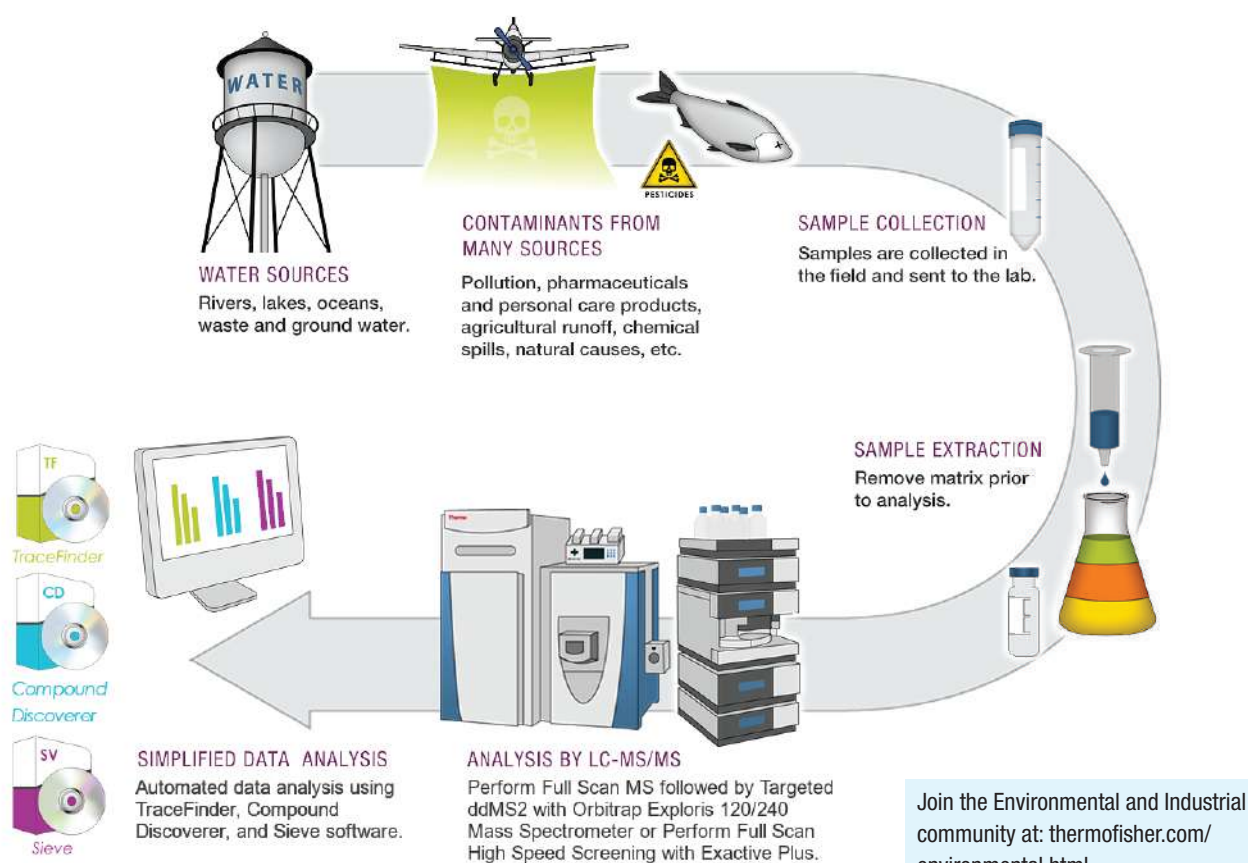
Simplify, speed up, and automate sample preparation to increase productivity and reduce the cost per sample.

### Sample Analysis

Rapidly separate and detect complex samples with industry-leading brands and innovations like Orbitrap, Vanquish, Dionex, and Liquid, Gas, Elemental, Automated Photometry, and Mass Spectrometry solutions.

### Data Management

Manage data with software solutions including enterprise-level offerings as well as software to maximize the functionality and efficiencies of your instruments.





# Thermo Scientific™ Food and Beverage workflow enablers

## Pesticides

HyperSep™ SPE Cartridges  
QuEChERS  
TraceGOLD™ GC Columns  
GC Consumables  
and Accessories  
Accucore™ aQ LC Columns  
Acclaim™ Carbamate  
LC Columns  
Acclaim Trinity Q1 LC Columns

## Mycotoxins

HyperSep Retain Cartridges  
Accucore aQ LC Columns  
Hypersil GOLD™ LC Columns

## Contaminants by GC-MS

HyperSep SPE Cartridges  
TraceGOLD GC Columns  
GC Consumables and  
Accessories



## Veterinary drug residues

QuEChERS  
Target2™ PTFE Syringe  
Filters  
Accucore VDX LC Columns

## Food quality/ Food labelling / Food fraud

HyperSep Retain Cartridges  
HyperSep SPE Cartridges  
Acclaim LC Columns  
Accucore LC Columns  
HyperREX™ LC Columns  
GC Columns and  
Consumables

# Transforming Your Science Solutions for Food and Beverage Testing

## W O R K F L O W

### Sample Preparation

Simplify, speed up, and automate sample preparation to increase productivity and reduce the cost per sample.

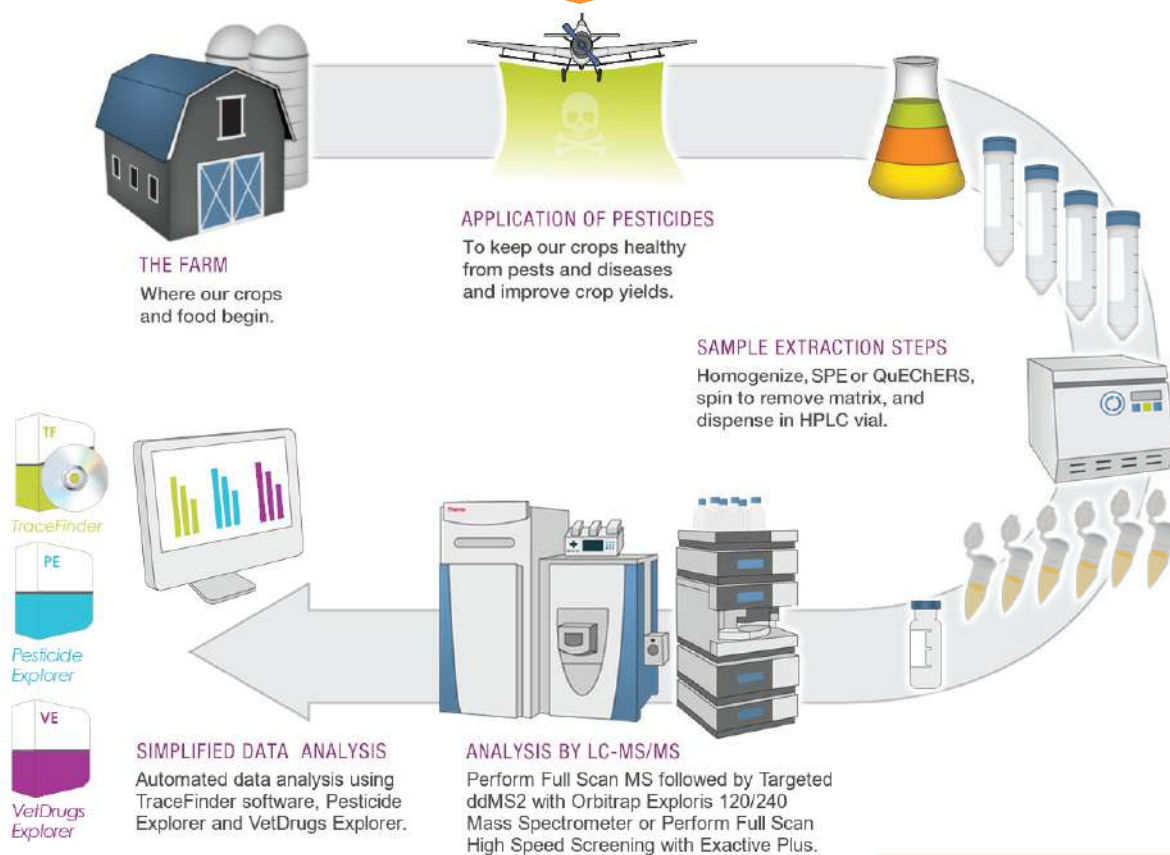
### Sample Analysis

Rapidly separate and detect complex analyte mixtures in samples with industry-leading brands and innovations like Orbitrap, Vanquish, Dionex, and Liquid, Gas, Elemental, Automated Photometry, and Mass Spectrometry solutions.

### Data Management

Manage data with software solutions including enterprise-level offerings as well as software to maximize the functionality and efficiencies of your instruments.

Example of Pesticides Analysis Workflow using LC-MS



Join the Food Community at:  
[thermofisher.com/food-beverage.html](http://thermofisher.com/food-beverage.html)



# Thermo Scientific™ Clinical research workflow enablers

## Forensic toxicology

SOLA™/SOLAμ™ SPE Plates and Cartridges  
HyperSep™ SPE Cartridges and Plates  
HyperSep™ Retain Cartridges  
Accucore™ Biphenyl LC Columns  
Accucore RP-MS LC Columns  
TraceGOLD™ GC Columns and Guard Columns

## Drugs of abuse research

SOLA/SOLAμ SPE Plates and Cartridges  
HyperSep Verify CX Cartridges  
Accucore Biphenyl LC Columns  
Hypersil GOLD™ LC Columns  
TraceGOLD GC Columns

## Supplement analysis

HyperSep Retain Cartridges and Plates  
Hypercarb™ HPLC and UHPLC Columns  
Hypersil GOLD PFP LC Columns  
Accucore aQ C18 LC Columns

## Amino acids, acylcarnitines, and succinylacetone research

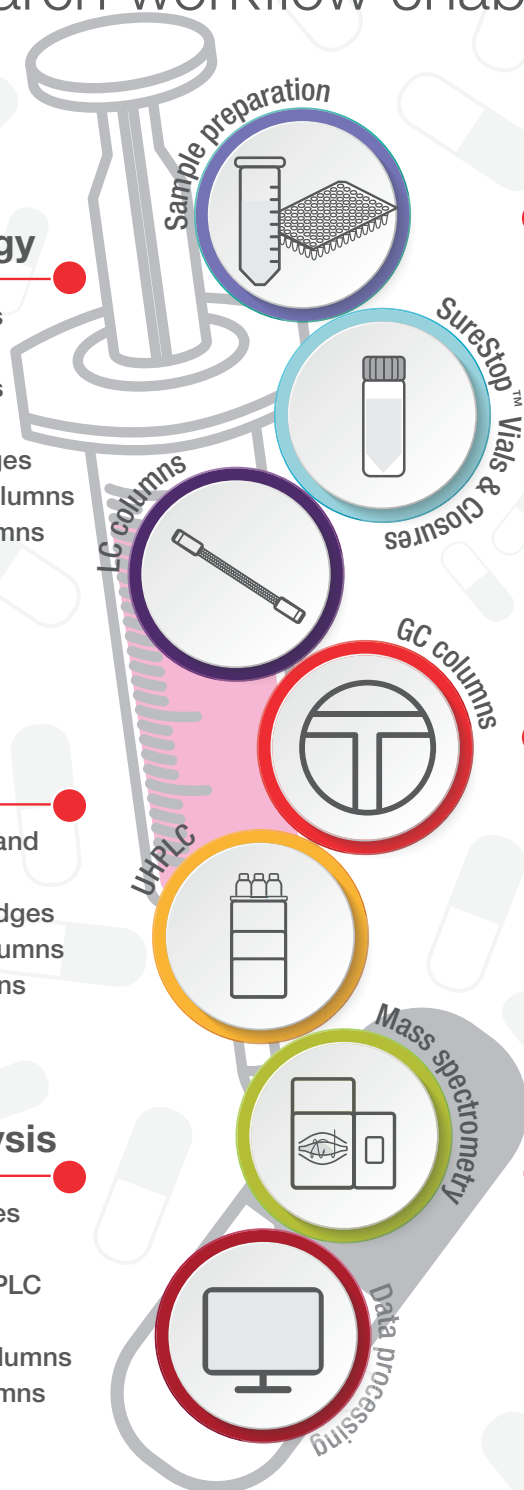
Hypersil GOLD C18 LC Columns  
Accucore aQ C18 LC Columns  
Acclaim™ HILIC LC Columns  
Titan3™ Syringe Filters  
HyperSep SLE Plates and Cartridges  
TraceGOLD GC Columns

## Translational proteomics

SMART Digest™ Kits  
SOLAμ SPE Plates and Cartridges  
EASY-Spray™ LC Columns  
PepMap™ RSLC Columns  
WebSeal™ Well Plates and Mats

## Drug monitoring research

SOLA/SOLAμ SPE Plates and Cartridges  
WebSeal Well Plates and Mats  
Acclaim 120 C18 Columns



# Transforming Your Science Clinical and Forensics

## CLINICAL AND TRANSLATIONAL RESEARCH

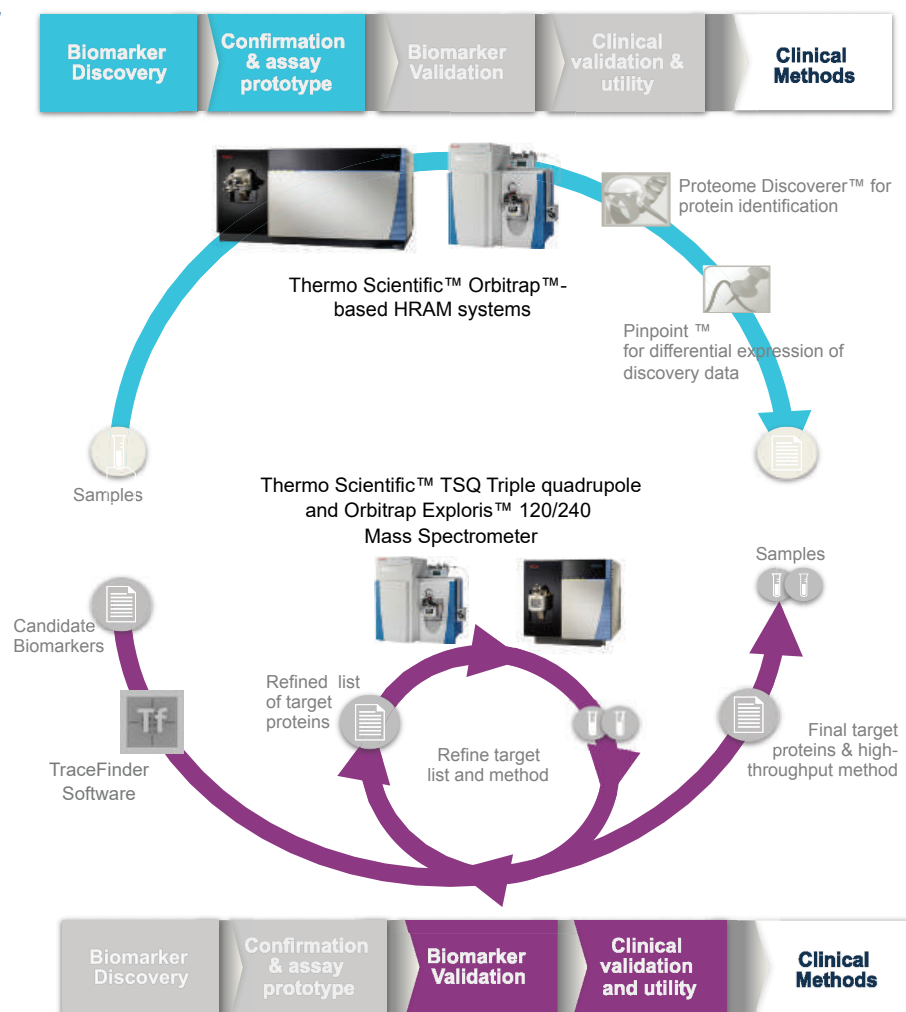
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Mass spectrometry is transforming the future of healthcare by enabling more accurate and sensitive results in areas never imagined. Our solutions support your continued research and understanding in biomarker, endocrine, inborn metabolism, pharmacology and drug monitoring, wellness, and trace element exposure.

## WORKFLOW



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Toxicology

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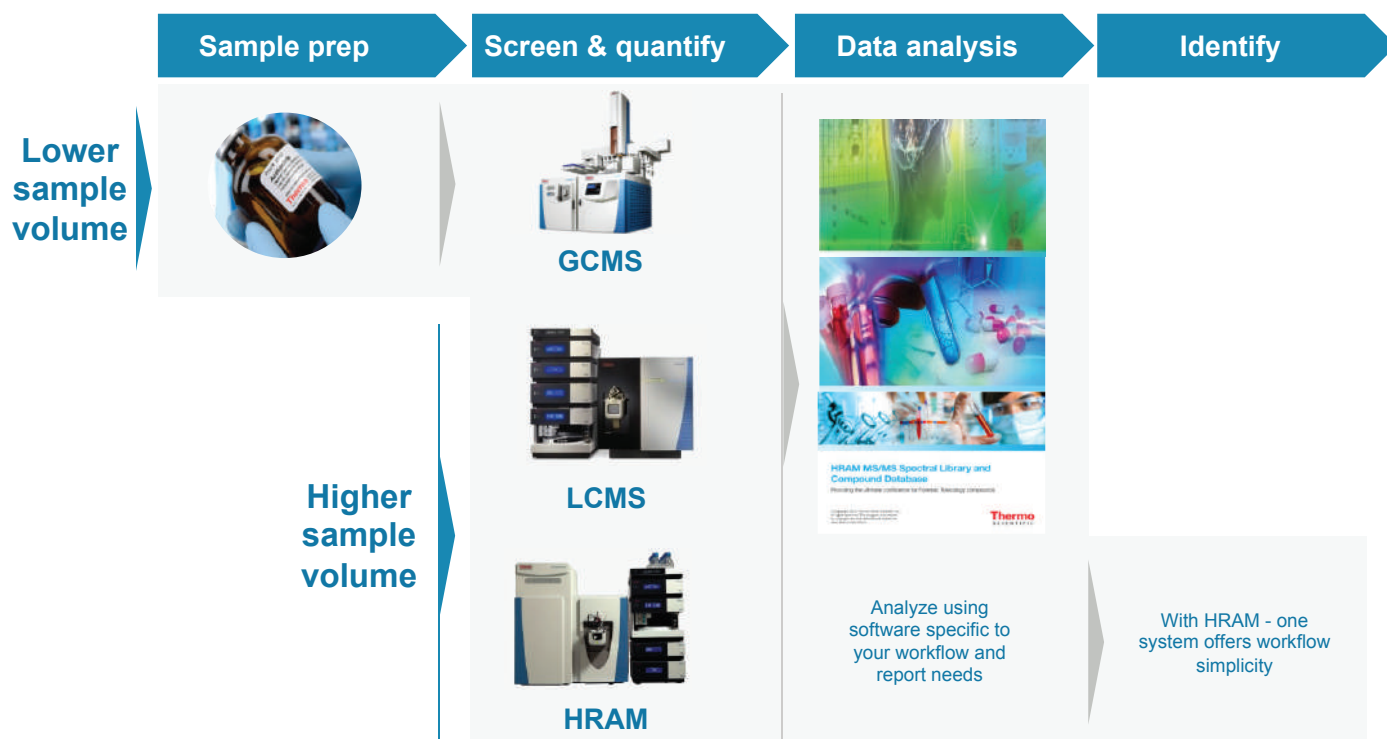


Antidoping

### Helping you keep sports true.

Our systems and customers demonstrate the specificity, sensitivity, and dynamic range for the substances you monitor.

## WORKFLOW



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**Bangladesh:** Represented by - Invent Technologies Ltd.,

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S C I E N T I F I C



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# Ask the Expert



## Ask the Expert

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