**Thermo Scientific
TSQ Quantum XLS Ultra
Triple Quadrupole GC-MS**

TSQ Quantum XLS Ultra

Introducing
ultra selective GC-MS/MS
persistent organic pollutants • food safety
drug screening • forensic evidence • sports doping

Thermo
S C I E N T I F I C

The gold standard in GC-MS/MS

Higher mass resolution with breakthrough ultra-selective reaction monitoring (U-SRM) with best-in-class selectivity and precision for an extensive range of GC/MS applications. Fast GC runs allow for multi-component analysis of more samples simultaneously.

The Thermo Scientific TSQ Quantum XLS Ultra triple quadrupole mass spectrometer is the highest performing GC-MS/MS instrument available. It features best-in-class target compound selectivity, analytical performance, and lab productivity – its the new "Gold Standard" from the technology leader in GC-MS/MS.

Thermo Scientific HyperQuad technology enables increased mass resolving quadrupoles for ultra-selective SRM, with best-in-class sensitivity, and allows unsurpassed analytical performance for the most difficult of matrix challenges.

This is the most selective GC triple quadrupole instrument available, yielding ultimate analytical performance particularly with regards to discrimination against chemical matrix background and detection of targets. Consequently, the TSQ Quantum XLS Ultra™ GC-MS/MS is especially applicable for labs seeking high performance and productivity advantages, especially in environmental, food safety, forensics, drugs and doping applications.

Low fg Sensitivity

Greatly Increased Mass Resolution

Unsurpassed Analyte Selectivity

Highest Productivity
for Real-Life Samples

The Highest Performing
GC-MS/MS Instrument Available

TSQ QUANTUM XLS ULTRA

Thermo
SCIENTIFIC

Unique value
for your most challenging analyses

The increased resolution offered by the new TSQ Quantum XLS Ultra GC-MS/MS enables more precise and reliable analyses to meet rigorous international standards.

Unique Target Compound Selectivity for POPs, Dioxin/dl-PCBs and Bioactive Compounds

- HyperQuad™ technology for very highly resolved Q1 precursor selection (<0.2 Da U-SRM)
- Unsurpassed analyte selectivity in very complex matrix extracts
- Superior results from less cleaned real-life sample extracts
- Reliable, first-time peak integration, quantitation
- Ion ratio confirmation compliant to official regulations

Superior Sensitivity, Superior Precision

- High precision at lowest concentration levels
- Lowest LOQs e.g. at low fg levels for TCDD
- LOD <1 ppb in typical difficult biological matrices such as urine, blood, plant tissue
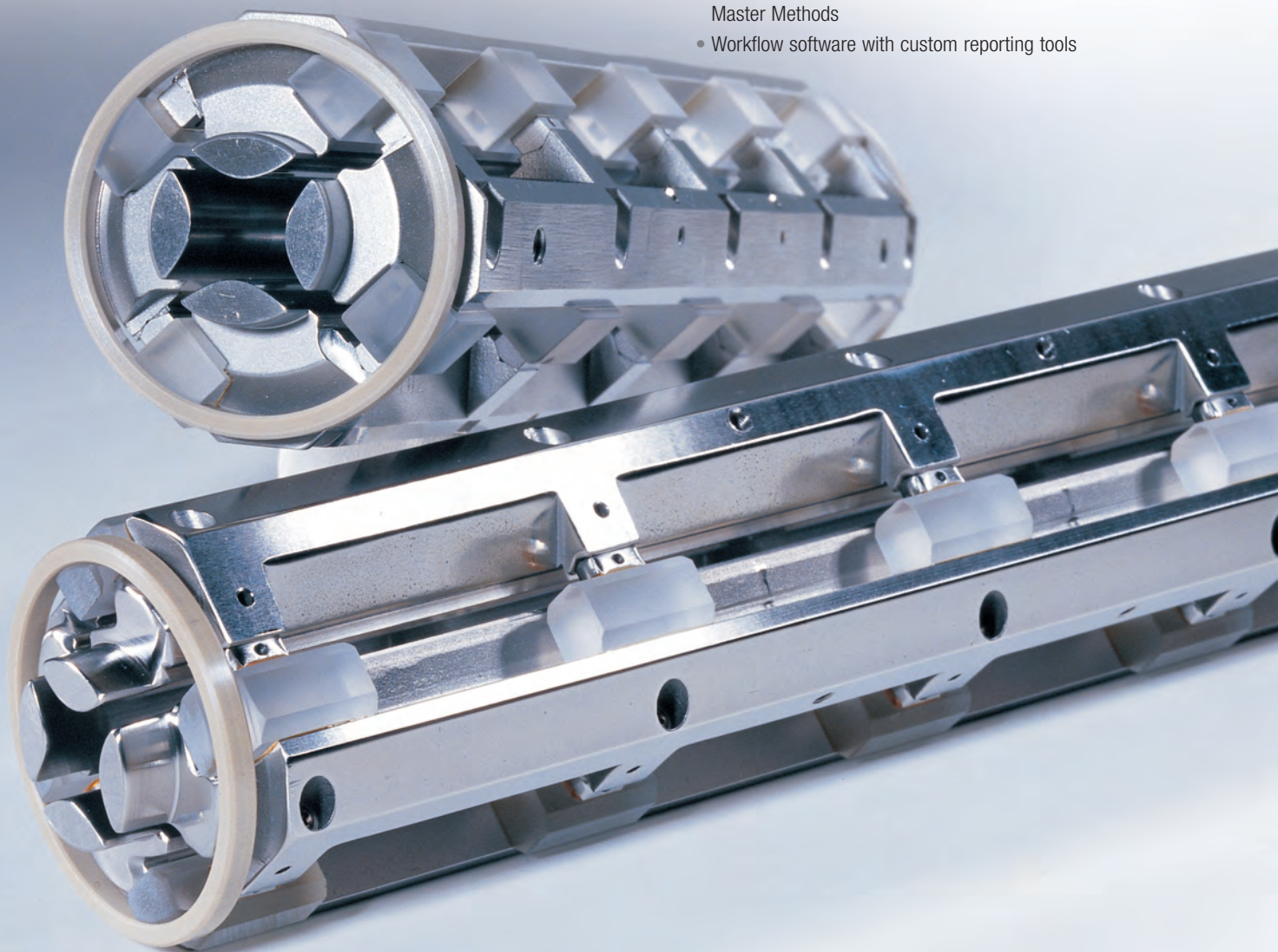
High Productivity

- Save precious sample prep time
- Screen more compounds in one run
- Especially suited for multi-component trace analysis
- Designed for fast-GC applications (10–15 m column lengths)
- Timed SRM acquisition for more than 1000 compounds in one fast run

Exceptional Robustness

- Maximum uptime for unattended operation with proven Thermo Scientific DuraBrite IRIS source
- Unique matrix pre-filter
- Robustness for a large number of matrix samples
- Ion volumes for quick exchange by vacuum interlock

Ease-of-Use – Workflow Software

- Simplified method installation and maintenance from Master Methods
- Workflow software with custom reporting tools
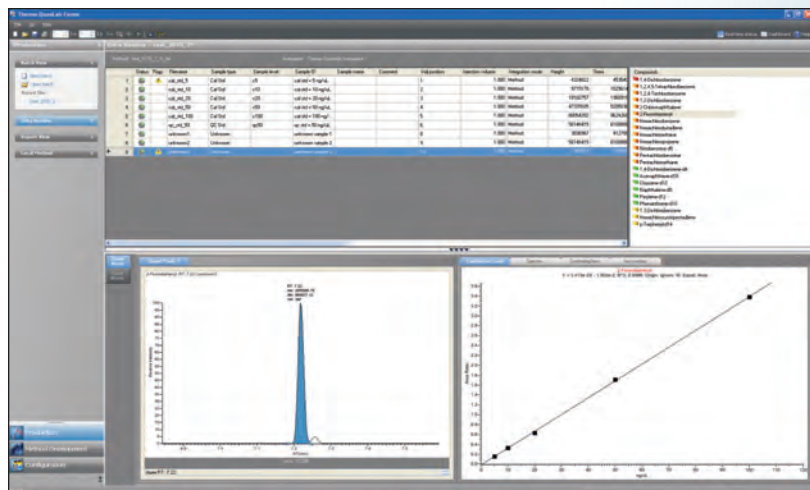
High-throughput, workflow-oriented software boosts lab efficiency.

DuraBrite IRIS Technology Inside

DuraBrite™ IRIS technology delivers greater sensitivity and extended maintenance cycles for more samples and more productivity.

Experience the benefit of Exchangeable Ion Volumes: replace the ion volume without venting the MS system. Designed for quick source maintenance, or for changing from EI to NCI or PCI operation and back for increased system uptime.

The new DuraBrite IRIS source technology delivers double benefits: highly inert materials prevent sensitive compounds such as drugs and pesticides from degradation and matrix components cut by the pre-filter do not enter the quadrupole analyzer.
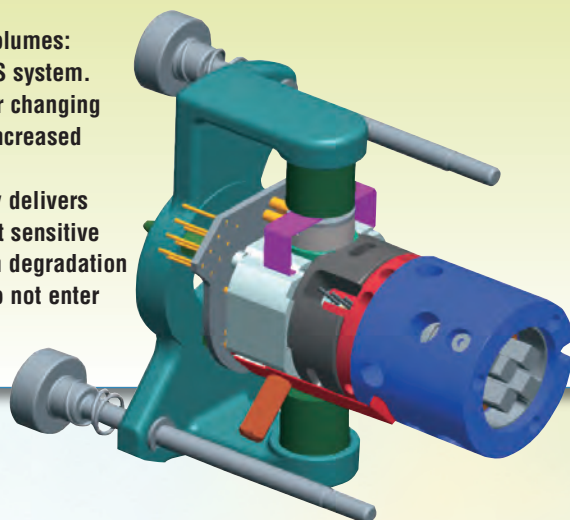
DuraBrite IRIS technology offers greater sensitivity, extended maintenance cycles and strong routine matrix robustness allowing more samples to be analyzed and increasing laboratory productivity.

Ultra selective GC-MS/MS...

...when standard SRM isn't enough

Single reaction monitoring (SRM) has become an established technique for analyzing target compounds in the most challenging matrices.

With the Thermo Scientific TSQ Quantum XLS GC-MS/MS, we introduced highly selective SRM (H-SRM). This capability allows operators to better isolate target compounds from the matrix background. The desire to produce fast results, however, often means sample purification steps are reduced and as a result, even higher performance is required from their GC-MS/MS systems.

Building on the success of the TSQ Quantum XLS system, another step up in SRM selectivity with Ultra Selective SRM (U-SRM) is introduced with the TSQ Quantum XLS Ultra GC-MS/MS. HyperQuad technology provides increased resolution of up to 0.1 amu. This translates into the most selective SRM available.

Optimize Clean-up Procedures

Leave your Background
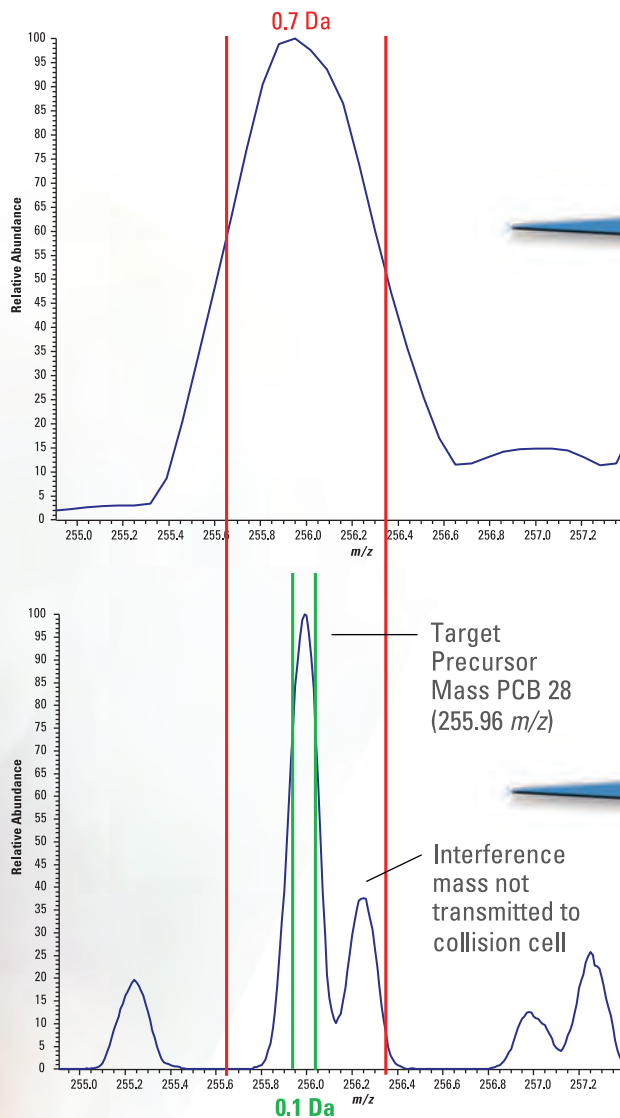Interferences Behind
at the First Stage of MS

Reduce Chemical Noise

Extend Limits of Detection in the
Most Difficult Matrices

Improve Peak Integration
Efficiency with Cleaner
Mass Chromatograms

0.7 Da

Target
Precursor
Mass PCB 28
(255.96 *m/z*)

Interference
mass not
transmitted to
collision cell

0.1 Da

**PCB 28 Q1 Precursor Selection in
Industrial Contaminated Soil**

During U-SRM, Q1 (first quadrupole) is set to only transmit the precursor mass of the target compound within a <0.2 m/z window. This means there is less opportunity for interfering masses to be transmitted to enter the collision cell, ultimately reducing chemical noise.

This reduction in noise allows increased detection capability in some of the most difficult matrices. It also extends the possibility for less vigorous sample clean-up to be carried out.

Another advantage is cleaner mass chromatograms than ever obtained before, allowing easy peak identification and integration. This means data can be evaluated quickly and easily, providing faster answers for high through-put laboratories.
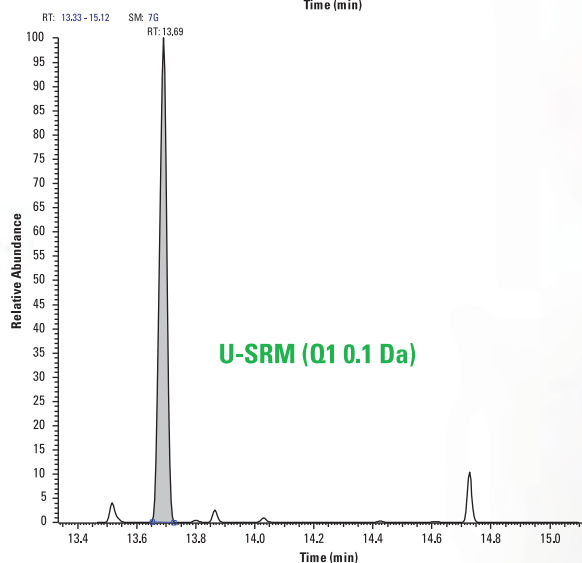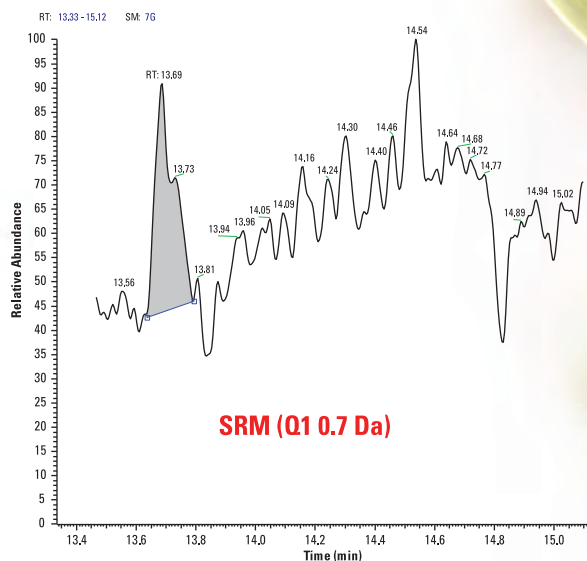
PCB 28 100 fg in Industrial Contaminated Soil
255.96 > 187.97

Compelling solutions
your lab's next competitive advantage

The TSQ Quantum XLS Ultra triple quadrupole mass spectrometer addresses the requirements of the most demanding analytical tasks across applications. Food safety, environmental, clinical, forensic, toxicology, pharmaceutical and metabolomics analyses can all benefit from the highest performing instrument available.

Unsurpassed Target Compound Selectivity

Clinical, forensic/doping, toxicological, metabolomic, and pharmacokinetic quantification/screening all require exceedingly selective MS analyzers. Reliable results that withstand any legal interrogation are key in drug related applications. The TSQ Quantum XLS Ultra GC-MS/MS comes with selectivity that is unmatched by any other GC triple quadrupole analyzer.

Chromatographic Integrity in Difficult Matrices

GC/MS/MS provides low-level quantitation for bioanalysis applications. Metabolomics applications in particular require target compound GC/MS quantitation for small molecule compounds in difficult matrices, which benefit from the extraordinary selectivity and robustness of a TSQ Quantum XLS Ultra GC-MS/MS.
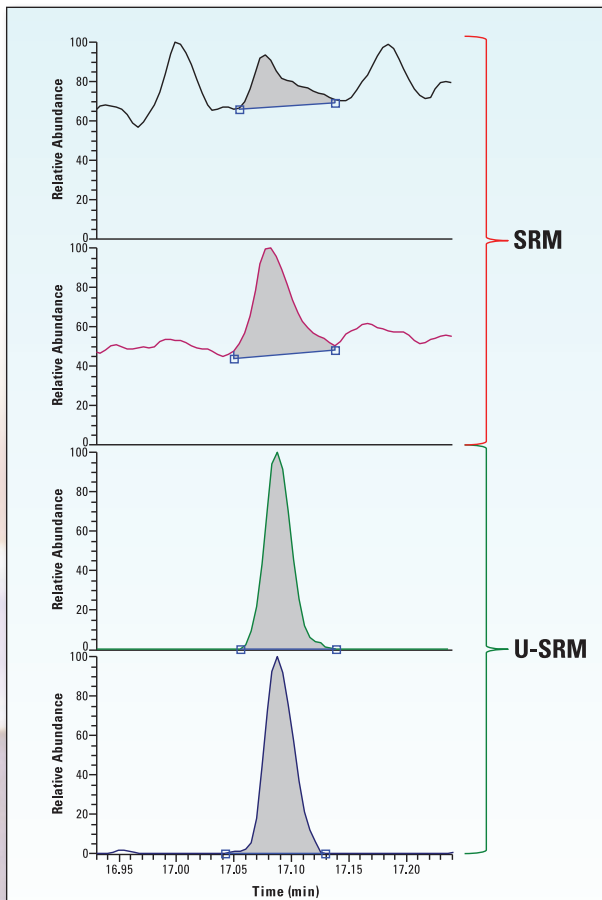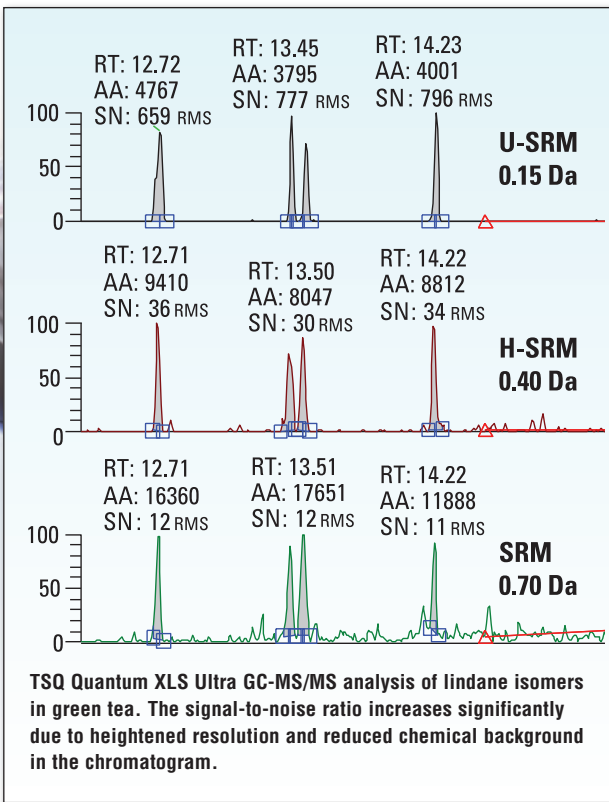
Designed for Tomorrow's Challenges

Frequent contamination crises in both food and environmental sectors result in extensive monitoring programs with lower detection limits and high sample matrix diversity. This is a big challenge for laboratories which leads to the need for powerful analytical methodologies to be able to succeed. From POPs to pesticides, with femtogram level sensitivity and U-SRM capability, the TSQ Quantum XLS Ultra GC-MS/MS delivers a complete system that is capable of meeting the regulatory challenges of both today and tomorrow.
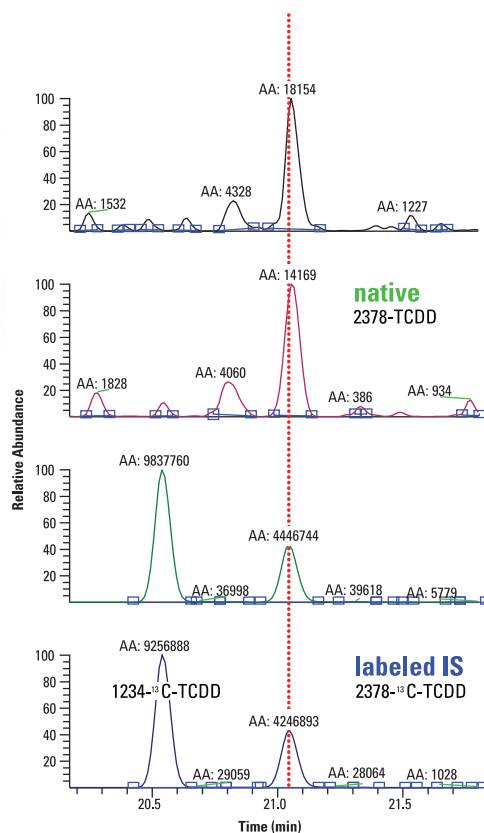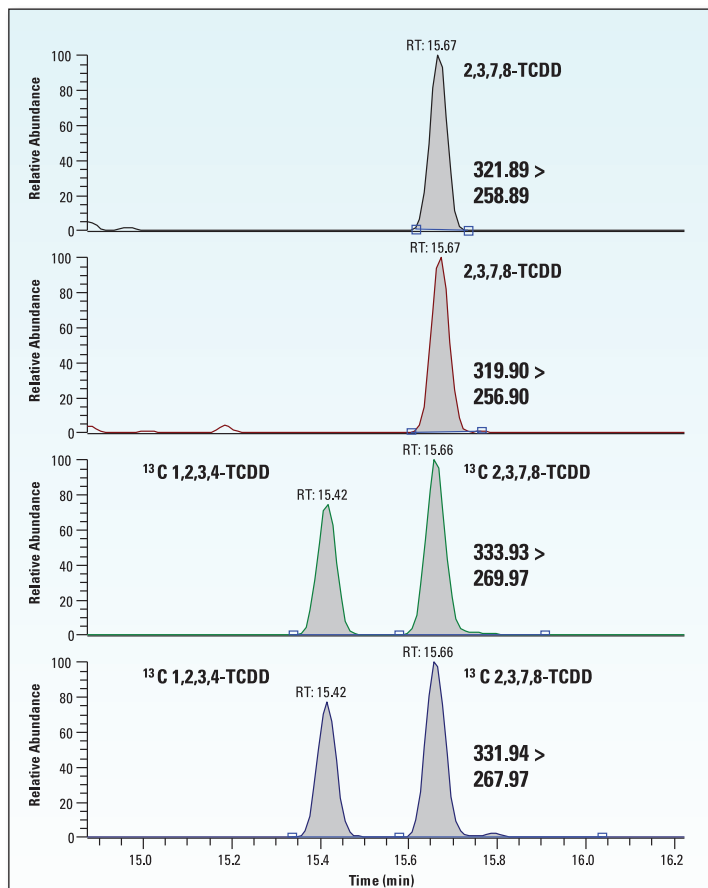

TSQ Quantum XLS Ultra GC-MS/MS: 2378-TCDD in a non-compliant milk sample (top: 2 transitions for native TCDD and 2 for 13 C labeled IS TCDD below).

A fast decision on compliance or non-compliance regarding maximum TEQ levels can be made.

RT: 12.72
AA: 4767
SN: 659 RMS

RT: 13.45
AA: 3795
SN: 777 RMS

RT: 14.23
AA: 4001
SN: 796 RMS

U-SRM 0.15 Da

RT: 12.71
AA: 9410
SN: 36 RMS

RT: 13.50
AA: 8047
SN: 30 RMS

RT: 14.22
AA: 8812
SN: 34 RMS

H-SRM 0.40 Da

RT: 12.71
AA: 16360
SN: 12 RMS

RT: 13.51
AA: 17651
SN: 12 RMS

RT: 14.22
AA: 11888
SN: 11 RMS

SRM 0.70 Da

TSQ Quantum XLS Ultra GC-MS/MS analysis of lindane isomers in green tea. The signal-to-noise ratio increases significantly due to heightened resolution and reduced chemical background in the chromatogram.

SRM

U-SRM

Endrin 1 pg in contaminated land sample ran in both SRM (Q1 0.7 amu) and U-SRM< (Q1 0.1 amu).

RT: 15.67
2,3,7,8-TCDD
321.89 > 258.89

RT: 15.67
2,3,7,8-TCDD
319.90 > 256.90

^{13}C 1,2,3,4-TCDD   RT: 15.66 ^{13}C 2,3,7,8-TCDD
RT: 15.42
333.93 > 269.97

^{13}C 1,2,3,4-TCDD   RT: 15.66 ^{13}C 2,3,7,8-TCDD
RT: 15.42
331.94 > 267.97

Animal fat sample with reduced sample clean-up PCDD/F-TEQ value is 0.95 pg/g fat. 125 fg of 2,3,7,8-TCDD injected.

Maximize productivity
with workflow-oriented software options

Maximum Versatility

Thermo Scientific Xcalibur Data System

The Xcalibur™ data system is the core operating system for each of the broad range of Thermo Scientific mass spectrometry systems. Offering a common set of easy-to-use, yet powerful, tools for GC/MS and LC/MS alike, Xcalibur software provides a unified experience for every user of every system. It offers instrument control, sample sequencing, and a set of programs for both qualitative and quantitative applications. Xcalibur software is also compatible with commercially available mass spectral libraries, such as NIST, Wiley and Maurer-Pfleger-Weber, and others. It also includes tools for generating and maintaining your own spectral libraries. Supporting each type of autosampler and GC available, Xcalibur software allows each mass spectrometer to be utilized to its fullest.
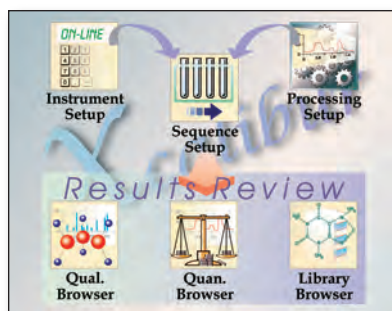

Easy Interpretation of Mass Spectral Data

Thermo Scientific Mass Frontier software provides a suite of options that allows the MS operator to interpret mass spectral data. This optional software package assists the operator in structural identification, isotope pattern determination, and spectral classifications.

Optimized Productivity

Thermo Scientific TraceFinder Software

The TraceFinder™ software application provides a streamlined workflow for the needs of a wide variety of high-throughput quantitative applications. Customized versions target the critical needs for key application areas, such as environmental, food safety, clinical research and forensic toxicology.

Beginning at the dashboard and working through each of the specialized modules, TraceFinder software guides the user through a highly productive workflow that is focused on the fastest route from sample to report.
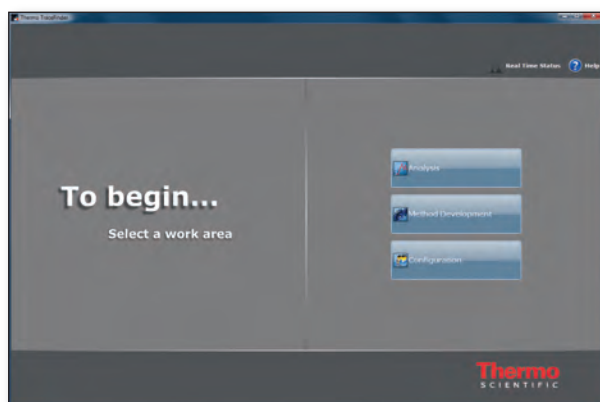
Automated processing and QA/QC review, coupled to a reporting system capable of both standard and customized hardcopy and electronic deliverables, this software provides a comprehensive system for high-productivity quantitation.

Thermo Scientific TargetQuan Software

TargetQuan™ software is uniquely tailored for a workflow-orientated POPs quantification. This software package is designed specifically to serve laboratories charged with performing routine quantification of POPs in a regulated environment. With TarrgetQuan software, comprehensive processing of MS, MS/MS and HRMS data is possible on a single software platform for the seamless quantification of:

- Dioxins and furans
- Polychlorinated biphenyls
- Brominated flame retardants
- Polybrominated diphenyl ethers
- Polychlorinated naphthalenes
- Other target compounds requiring isotope dilution techniques

Simplified Workflow for Efficient Data Processing

- Import Xcalibur sequences for batch processing and automatically integrate peaks, generate response curves and quantify data
- Process entire batches through new sequence tab function

Data Processing Built for POPs

- Quantification, based on relative response factors (RRF)
- Optional quantification, based on the average response according to EPA 1613 (PCDD/F) or EPA 1668 (PCB)
- Incorporation of Toxic Equivalences (TEFs) to automatically calculate Toxic Equivalent Quotient (TEQ)
- Flagging of out-of-range ion ratios
- Totals calculations
- Lower, medium, and upper bound value calculations spectral classifications

Regulatory Conformity for Reporting Confidence

Target quantification is achieved with conformity to international protocols such as:

- US EPA 1613b, 1668b, 1614, 8290, Method 23
- Japan JIS K 0311/0312
- Europe EN 1948
- Commission Directive 2002/70/EC
- Council Directive 96/23/EC

Versatility for Maximum Productivity

- Fully customizable screen layouts
- Create views of your data the way you want
- Tabbed views for simple navigation
- Report templates
- Define printed or electronic reports including options to print calculated values and chromatograms
- Custom calculations
- In addition to the standard calculations required for POPs data analysis, TargetQuan 3 provides the flexibility to fully customize for calculations the way you want them.

Excellence in GC-MS begins with the GC

Match GC and autosampler options to your lab's needs
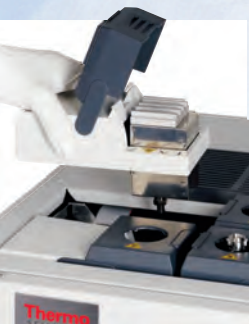
Example of instant connect module installation by user

Ground-Breaking Instant Connect Modularity

Tailor the Thermo Scientific TRACE 1310 GC to your needs with its proprietary user-exchangeable instant connect injector and detector modules. Swapping modules is easily done by the removal of three screws, accessible from the top of the GC. The entire process takes less than two minutes. This enables budget-conscious laboratories to expand their capabilities to accommodate new application and throughput demands.

With the TRACE™ 1310 GC paired with your TSQ Quantum XLS Ultra, tomorrow's opportunity is in your hands today.

Less is More

The oven, injectors, and detectors of the TRACE 1310 GC have a very low thermal mass. This enables faster heat-up and cool-down times, reducing your inject-to-inject time and increasing your sample throughput.

A completely new range of micro-volume GC detectors increases sensitivity and reduces required sample amounts and re-concentration requirements.

Easy Operation, Easy Maintenance

The TRACE 1310 GC offers an intuitive, icon-based touch screen interface which allows for local control of the GC. In addition, tool-free access to septa and liners allows for quick routine maintenance. When more aggressive injector cleaning is needed, easy removal of the entire injector body allows for sonication in solvent. Finally, two easily accessible carbon traps ensure the injector and flow lines stay clean. Combined, these new features on the TRACE 1310 GC make it the most serviceable GC in the world.

Thermo Scientific TRACE 1310 GC with TriPlus RSH autosampler

Thermo Scientific Autosampler Options

Precise sample introductions are required for best reproducibility and accuracy. The Thermo Scientific AI/AS 1310 autosampler and TriPlus RSH autosampler offer ideal solutions for automated injections.

TriPlus RSH Autosampler – Robotic Sample Handling

Unmatched Performance for Liquid Injection

The TriPlus™ RSH autosampler offers optimized liquid injection modes to support a wide range of sample types, inlets, and techniques for syringe-filling and injection. The ability to fully optimize your injection technique combined with precise robotic movement of the autosampler enables the delivery of the precision you demand for achieving truly exceptional results.

Automatic Tool Change: A Revolution in Online Sample Preparation

The automatic tool change feature enables the user to set up a sequence using up to six different syringes automatically loaded by the autosampler. This makes it the most flexible autosampler for enhancing laboratory productivity by offering the following:

- Switch from liquid injection, to headspace, to SPME* – all in the same sequence
- Automated calibration preparation with or without internal standards
- Reagent additions, with programmed incubation times for derivatization
- Vortexing station allows for sample homogenization

AI/AS 1310 Autosampler

The AI 1310 offers a basic configuration for up to eight vials at a time, while the AS 1310 holds 105 standard liquid autosampler vials. Excellent precision and tool-free alignment make this sampler a perfect choice for routine liquid sample injections.

Thermo SCIENTIFIC

Part of Thermo Fisher Scientific