

Thermo Fisher SCIENTIFIC

Unstoppable GC-MS technology to boost your laboratory efficiency

Daniela Cavagnino Product Marketing Manager GC & GCMS

The world leader in serving science

Pressures on routine laboratories

- Lower detection requirements and varying sample types
- More results in less time, without compromising quality
- Removing complexity, for maximum analyst productivity
- Meeting today's requirements, and being ready for tomorrow

Requirements

- Highly sensitive and robust GC-MS and GC-MSMS
- Highest uptime and stripping out cost in result production
- Ease of use, from method development to routine analysis
- Ability to scale their technology with their needs



ISQ 7000 GC-MS & TSQ 9000 GC-MS/MS system highlights

Ultimate Sensitivity with Advanced Electron Ionization source

Extended Uptime with inherent robustness and NeverVent[™] technology

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

True **SCalability** to face evolving regulatory requirements

UNSTOPPABLE



Pierraia a service

ISQ 7000 GC-MS system – Designed with intention



TSQ 9000 GC-MSMS system – Designed with intention



Ultimate Sensitivity with the new AEI source

UNSTOPPABLE



SCIENTITIC

Introducing the Advanced Electron Ionization (AEI) source

Inheriting from the Thermo Scientific[™] ExtractaBrite[™] ion source

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



Adding innovative design for superior sensitivity and robustness

- Highly efficient ionization
- Tightly focused ion beam





ISQ 7000 AEI system - Push boundaries of sensitivity



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

Semivolatiles compounds - ISQ 7000 AEI system





TSQ 9000 AEI - Sensitivity down to attogram range



IDL performance of the TSQ 9000 (AEI) for OFN using repeated injections of 1 fg on-column

*IDL <0.4 fg verified at installation under predefined conditions



IDL performance of the TSQ 9000 (AEI) for 2,3,7,8-TCDD using repeated injections of 5 fg on-column

*IDL is a demonstration of maximum performance calculated using only a single compound and not taking into account full confirmatory method criteria for regulated dioxin analysis



TSQ 9000 AEI - Sensitivity down to attogram range

thermoscientific APPLICATION NOTE 10590 Low level quantification of PCDD/Fs in animal feed using the Thermo Scientific TSQ 9000 triple quadrupole GC-MS/MS system with AEI source

Thermo Fisher

Pesticide analysis – TSQ 9000 AEI system

Instrument detection limit (IDL) for QuEChERS food extracts



Pesticide analysis – TSQ 9000 AEI system



Thermo Fisher

13

Pesticide analysis – TSQ9000 AEI system

thermoscientific



Ultra low level quantification of pesticides in baby foods using an advanced triple quadrupole GC-MS/MS system

> ThermoFisher SCIENTIFIC

Extended uptime for enhanced laboratory efficiency





Keeping your production running

Ion source robustness built-in

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

NeverVent Technology

- Unique Vacuum Probe Interlock (VPI) design
- Vent free GC column exchange
- Vent free ExtractaBrite ion source exchange





NeverVent technology for no vent source exchange

Extends the capability of the vacuum probe interlock (VPI) design with the newly introduced source plug, V-Lock Through the VPI, no need to vent mass spec system for extracting the wireless ExtractaBrite ion source

Step 4. Push source out of tool

Step 1. Insert removal tool

Step 2. Remove source

Step 3. Hot source is held in tool



NeverVent technology for *column* exchange

What is NeverVent technology?



Extends the capability of the Vacuum Probe Interlock (VPI) design with the newly introduced source plug, V-Lock

V-Lock Isolate the MS under vacuum from the GC No complicated fluidics

or extra connections

Through the VPI and the V-Lock source plug, no need to vent mass spec system to change the analytical column

Through the VPI and the V-Lock source plug, no need to vent mass spec system to make injector maintenance

NeverVent technology for *column* exchange

Time savings using NeverVent technology:



- NeverVent reduces downtime and maximize sample analysis
- Increases the lab efficiency by saving the time otherwise wasted in recovering MS operation
- Your time can be spent on producing quality results

Extended capability with the VPI

Direct Sample Probe - ideal for materials difficult to elute chromatographically

- Designed to eliminate sample preparation time
- Compatible with all modes of ionization and mass analysis
- Simplified use through the vacuum probe interlock (VPI)

- Direct Insertion Probe (DIP) ideal for solid samples or trace components in solid matrices such as forensic samples, tissue, etc.
- Direct Exposure Probe (DEP) ideal for liquids or solids dissolved in a suitable solvent.



SCIENTIELC

Unstoppable uptime

Advance Electron Ionization (AEI) source – extended robustness

- Highly focused ion beam makes this ion source extremely robust
- Maintenance frequency is significantly reduced even with difficult matrices
- Utmost sensitivity is now achieved with extended robustness, ideal for challenging samples





AEI robustness ~900 Acetonitrile QuEChERS injections



Liberating routine labs with ISQ 7000 AEI



Routine Ease of Use

UNSTOPPABLE



New Software Tools

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

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



Thermo Fisher

SmartTune and Advanced Tune - Comprehensive choice for every need

SmartTune

- Easiest tune for beginners & new users
- Guides users through any necessary troubleshooting operations

Less time tweaking, more time running!

Advanced Tune

- Advanced tuning parameters for regulatory system suitability requirements
 - E.g. EPA DFTPP and BFB requirements
- Tuning method for CI sources

High degree of customization for advanced users.

Thermo Fisher

New Software Tools

Retention Time Alignment

- Easy and fast SW tool to maintain retention times during routine operation
- n-Decane (C10) is used as the only target reference compound
- No need for long calibration sequence
- Only one injection is needed providing quick method transfer in GC or GC-MS





Auto SIM/SRM – Streamlined method set up workflow





A real time saver and productivity booster



Method Development - AutoSRM



AutoSRM

- A triple quad method development expert integrated into your system
- Provides full method development independence
- Fully optimised SRM transitions for your system, even for less experienced users
- Saves huge amount of time and effort



Method Development - From Single Quad, to Triple Quad



SIM Bridge

- Simple tool to migrate from single quadrupole to triple quadrupole
- SIM methods exported from other sources to be translated to the TSQ 9000 system method
- SIM methods can be immediately run on the TSQ 9000 system or through AutoSRM to translate the SIM information into a powerful SRM method

SCIENTITIC

Timed-SIM /SRM – Maximizes sensitivity in case of large number of analytes

- Reduces complexity in high capacity methods
- Automatically optimizes target compounds for maximum sensitivity
- Simply enter RT for compounds and windows automatically set
- Easy method updates with new GC column or GC column trimming
- t-SIM/SRM is complementary to AutoSIM/SRM for a fully automated workflow





Segmented SIM/SRM (classic approach)

- Complicated to set time windows
- Susceptible to matrix RT shift

Timed-SIM/SRM

- Automated window definition
- Resistant to matrix RT shift



Operational simplicity and intelligent functionality

- Reduce errors in sequence setup using Thermo Scientific[™] eWorkflows[™]
- Achieve more "right first time" analyses using Intelligent Run Control
- Experience faster data processing, reviewing and reporting with dynamic updating and smart tools built in
- Customizable reporting templates for common workflows e.g. WADA testing laboratories



e-Workflow streamlines daily operations

- eWorkflow automates laboratory processes related to a chromatographic analysis
- It guides from samples to results in the minimum number of steps
- Assists in creating sequences of analyses through pre-defined structure and associated methods

Chromeleon Console	State of the local division of the local div		- AL - A - A - A - A - A - A - A - A - A
Back C Create File	<u>E</u> dit ⊻ew <u>T</u> opls <u>H</u> e		20 ³
eWorkflows	*		JAN SAN
👺 🔕 🔆	File: Y		No C
More fiters (none)	*		Ú D
ChromeleonLocal	*	Fixed Calibration, Check Standards, QC Samples, Unknowns	-
Privitonmenta Wordlow Environmenta Wordlow	Templates - Daily Analysis Templates - Initial Calibration Templates - MDL	Tune Check, Calibration Curve, QC Samples	
O Environmental Workflow	Iempietes MVD	Fixed Calibration, Check Standards, Injections for computing Minimum Detection Level	35° 1
		Fixed Calibration, Check Standards, Injections for performing metho	od validation



Thermo Scientific Chromeleon Chromatography Data System (CDS) software

- Control your entire chromatography lab. It is fully scalable from a single workstation to an enterprise-wide installation.
- Control of more than 350 modules from Thermo Fisher Scientific[™] and many other vendors
- Quantitative mass spectrometry workflows for all separation techniques and MS variants, all using the same intuitive user interface.



Scalable in a changing laboratory environment

UNSTOPPABLE



ThermoFisher SCIENTIFIC

Pick your configuration ISQ 7000

Perfect for today, ready for tomorrow

- Fit for purpose GC-MS solution
- Grows with evolving regulatory requirements
- Base to advanced configurations
- Full field upgrade path

Ultra high sensitivity and robustness

High-throughput solution ISQ 7000 NeverVent El & Cl

High-throughput solution ISQ 7000 NeverVent El

Affordable first entry 66L/s ExtractaBrite



Accessible high performance 300L/s ExtractaBrite



Unstoppable scalability TSQ 9000

Perfect for today, ready for tomorrow

- Grows with laboratory requirements
- From base to advanced configurations
- Full field upgrade path

Ultra high performance and robustness TSQ 9000 AEI

High-throughput solution TSQ 9000 NeverVent EI & CI



(1)

÷.

Most accesible entry from SQ>TQ 240L/s ExtractaBrite



Affordable performance 300L/s ExtractaBrite

- C



37

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

C ST UK

For more information thermofisher.com/unstoppableGCMS

38

auce

