

thermo scientific



NOW YOU'RE  
**UNSTOPPABLE**

Thermo Scientific ISQ 7000  
Single Quadrupole GC-MS System

**ThermoFisher**  
SCIENTIFIC

# Unstoppable GC-MS Routine Analysis

Routine laboratories working in food, environmental and forensic/toxicology analysis face a dynamic environment of changing regulatory requirements, lower detection levels, more compounds, less time, lower margins and increased competition. In short, the analytical systems need to be unstoppable, your laboratory needs to be unstoppable.

The Thermo Scientific™ ISQ™ 7000 GC-MS system is a GC single quadrupole platform capable to boost laboratory efficiency and productivity through increased robustness combined with superior sensitivity to fulfill your most challenging analytical needs.

Developed to enhance the user experience in routine workflows, the ISQ 7000 GC-MS system is streamlined to ensure great data consistency over time while offering new automated instrument control tools for an unprecedented ease-of-use and a quick learning process, as required in a high-throughput laboratory.

The innovative technology of the ISQ 7000 GC-MS system is uniquely designed to offer truly scalable performance that addresses increasingly challenging regulatory requirements and offers more value through future-proof investments.

Highly versatile configurations are tailored to satisfy your current and future analytical needs for truly unstoppable performance.





Food Safety



Environmental  
Contaminants



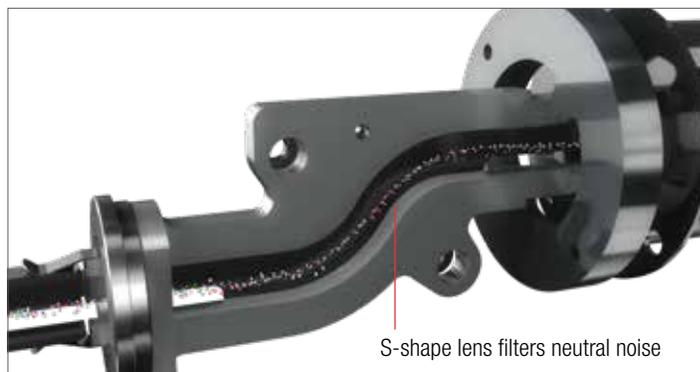
Forensic/  
Toxicology



# Unstoppable sensitivity

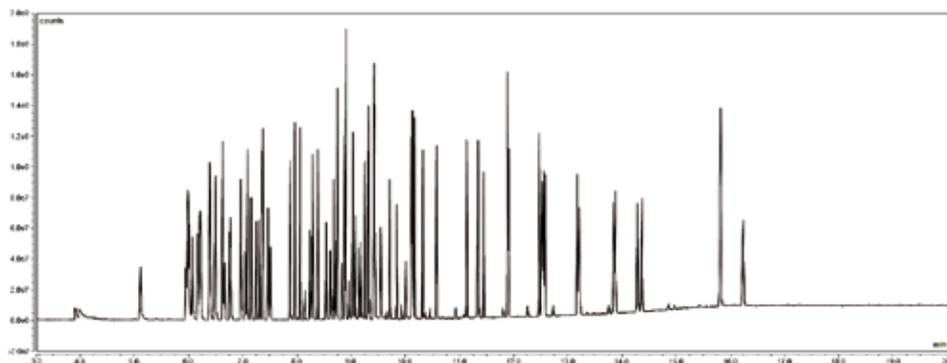
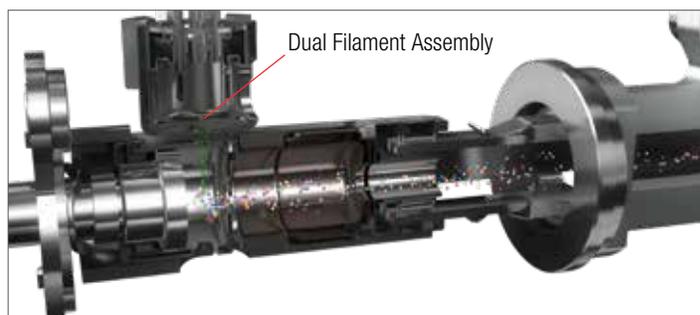
Easily meet your required detection limits and consistently meet them even as you continue to run samples. It's not only about how sensitive your system is when it first arrives, but how long you can continue to achieve your required performance levels. This is the true measure of productivity.

Achieving lower detection limits using a single quadrupole GC-MS system requires breaking boundaries of noise – chemical noise, electronic noise, and neutral noise. Chemical noise and neutral noise contribute to higher backgrounds and affect detectability – the ability to distinguish a low-concentration target from noise. The quality design reduces chemical and neutral noise, allowing for lower detection limits and improved sensitivity. The off-axis ion source with patented pre-filter, combined with a unique s-shaped ion guide, dramatically reduce the effects of excited helium neutrals reaching the detector by creating a curved path that the neutrals cannot navigate.

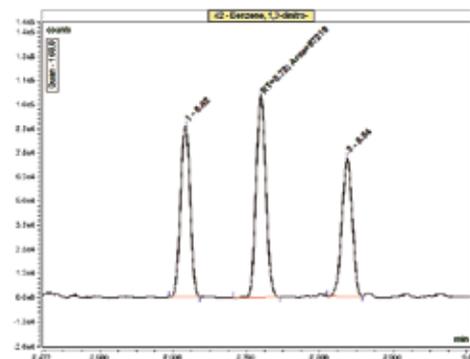


## ExtractaBrite Ion Source

Robust, rugged electron ionization (EI) and chemical ionization (CI) performance – proven in routine applications in the ISQ 7000 GC-MS system. Fully removable without breaking vacuum for maintenance or switching to chemical ionization (CI). Also exchangeable with the unique V-lock source plug, enabling direct-connected GC column replacement & maintenance without venting the MS system.



US EPA 8270D – 5 ppm standard TIC chromatogram



Ortho, meta, para-Dinitrobenzene at 0.2 ppm

Mode	Range (PPM)	# of Analytes	Average Curve RSD%	Avg. # of Analytes with > 20% RSD
Splitless	0.2 - 50	88	8.03*	4
10:1 Split	2.0 - 200	88	8.39*	7

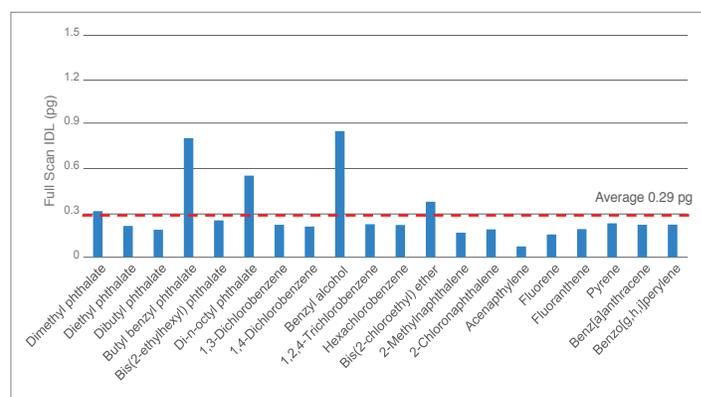
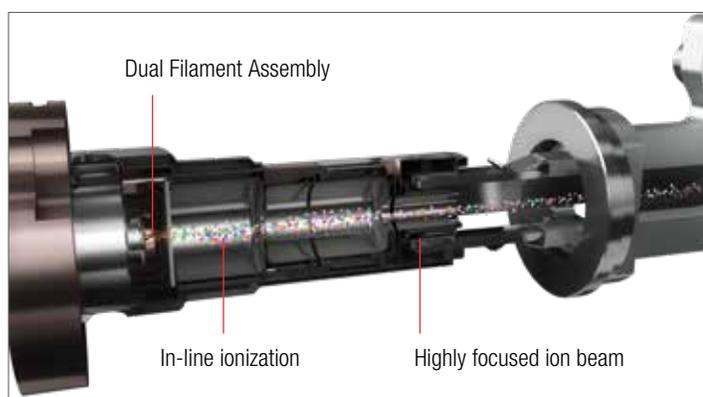
\* Does not include compounds that were above 20% RSD

The ISQ 7000 GC-MS system can deliver high sensitivity for more routine analysis through the renowned, highly robust Thermo Scientific™ ExtractaBrite™ ion source technology. For the highest level of sensitivity, the ultra-robust Thermo Scientific™ Advanced Electron Ionization (AEI) source can be configured to lower the instrument detection limits, unlocking new possibilities for your laboratory.

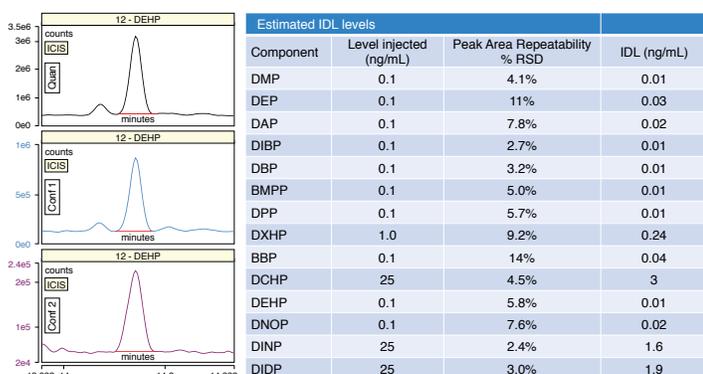
## Advanced Electron Ionization (AEI) Source

Discover the new ultra-robust, ultimate sensitivity electron ionization source available in a dedicated ISQ 7000 configuration. It features a highly efficient ionization of analytes and a more tightly focused ion beam, driving down instrument detection limits and assuring a higher level of robustness against possible contamination.

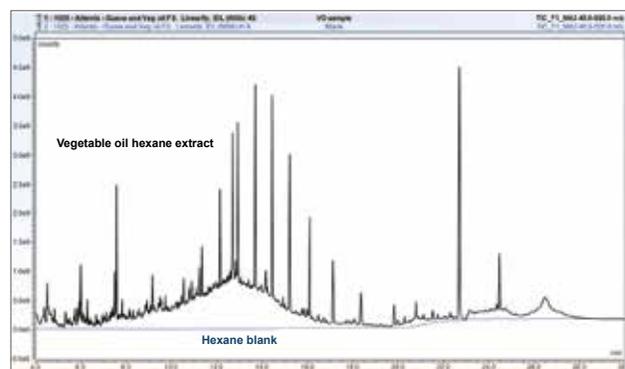
Thanks to the new AEI source, it is much easier to tackle the most challenging applications, as well as relieve matrix pressure on the analytical system, through the reduction of concentration steps in sample preparation. Because of its unique design, the AEI source offers an extended robustness grade.



IDL for semivolatile consistently at sub-ppb levels in full scan acquisition in the range 50-550 atomic mass unit (amu)



Highly sensitive determination of phthalates on vegetable oil extracts by timed-SIM acquisition and estimated IDL



TIC chromatogram of vegetable oil hexane extract. Overlay with hexane blank.

# Unstoppable uptime

Re-think the way your lab operates with technology designed to keep you productive longer without interruption. Maintaining uptime during routine analysis drives service delivery and lowers overhead cost. The ISQ 7000 GC-MS system is designed to minimize maintenance intervals with routine-grade robustness and eliminate up to 98% of the downtime associated with routine maintenance of a system. With NeverVent™ technology and Thermo Scientific™ Instant Connect modularity, along with a high robustness design throughout, your instrument is reliably online to produce the highest quality results possible.

## Enhanced robustness through ion source design

The ISQ 7000 GC-MS system is specifically designed to deliver consistent results longer and to achieve higher sample throughput with almost no downtime. When you select either the ExtractaBrite or AEI configuration, you will benefit from class-leading robustness to maximize uptime between routine maintenance interventions. Your system performs as you need it, when you need it.

The wireless ExtractaBrite ion source is comprised of highly inert material for the highest sample path integrity. The ion source is heated throughout and includes a unique and patented RF pre-filter, commonly the first place susceptible to ion burn. This design ensures high matrix tolerance for high throughput applications and protects the mass analyzer from contamination. There is never a need to heat or clean quadrupoles.



AEI Ion source



ExtractaBrite Ion source

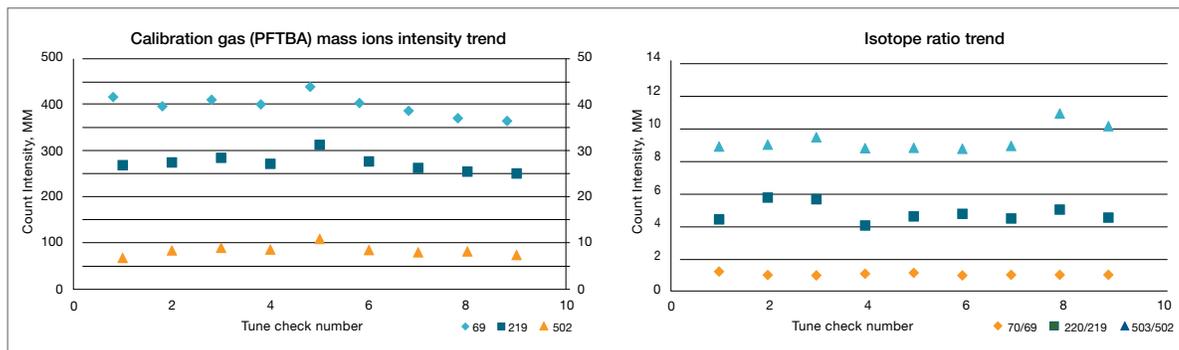
RF Lens Filter



Dual Heater design heats ion volume, lens stack, and RF lens to prevent matrix build up

The AEI source is also heated throughout, with RF pre-filter lenses to prevent ion-burn effect into the quadrupole. In addition, the AEI source benefits from an innate ultra-robustness due to a more tightly focused ion beam, which limits matrix burn in the ion path. With the AEI source the maintenance interventions are reduced further, for extended uptime.

Independently heated zones for transfer line, ion source, and ion optics help ensure that the system stays cleaner for a longer period of time.



System stability over 400 matrix (QuEChERS food extract) injections without ion source maintenance. The plots are showing the Calibration gas mass ions stability (intensity and ion ratio) over the matrix injection series.

# NeverVent Technology

ISQ 7000 system takes your GC-MS uptime to the next level with patented NeverVent technology.\* Using the vacuum probe interlock (VPI) in conjunction with the ExtractaBrite ion source and the new V-Lock source plug, routine maintenance operations such as source cleaning and column changing

can be performed on the system without the need to vent the mass spectrometer. This boosts instrument productivity to unprecedented levels, meaning your time can be spent on producing quality results.

\*Only available with ExtractaBrite configuration



## Vacuum Probe Interlock (VPI)

Using the VPI, the Extractabrite ion source is fully removable (even when hot) under vacuum for necessary cleaning or swapping with a spare source. There is never a need to vent to clean your instrument.

## V-Lock

Exclusively available on VPI enabled systems, V-Lock isolates the vacuum region of the mass spectrometer from the column. This enables GC column changes to be performed quickly,

with no venting required. There are no complicated fluidics with additional auxiliary gases or column unions that can potentially leak.

		Maintenance activity	
		Change column** (hrs: mins)	Exchange ion source (hrs: mins)
<b>Standard GC-MS</b>	Requires vacuum system venting and pump down operations	 4:35	 4:00
<b>NeverVent</b>	No venting and pump down of vacuum system required	 00:35	 00:05
<b>NeverVent time savings</b>		<b>87%</b>	<b>98%</b>



\*\*Includes conditioning



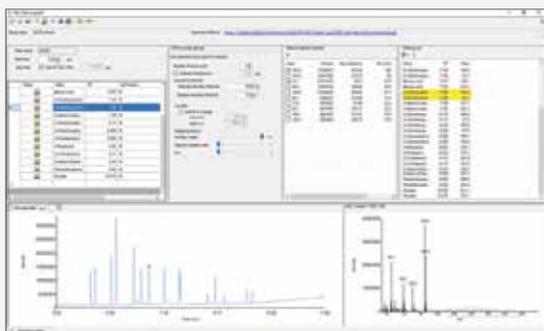
## Step into modern gas chromatography

Tailor the Thermo Scientific™ TRACE™ 1300 Series Gas Chromatograph to your needs with its proprietary user-exchangeable Instant Connect injector and detector modules. Swapping modules is easy – simply remove and replace three screws, accessible from the top of the GC system. This entire process takes less than five minutes without requiring specialized service assistance or dedicated tools. This modularity enables maximum uptime with offline cleaning and servicing of the GC inlet possible by adding a spare module to your configuration.

# Unstoppable ease of use

Don't let complexity stand in the way of unstoppable productivity. Truly powerful routine workflows have to be easy to stay productive and deliver quality results on time, every time. It's this reason why the ISQ 7000 GC-MS system includes a comprehensive set of simple tools to provide the user with a seamless experience during the transition from other platforms, analytical method development and routine analysis of samples.

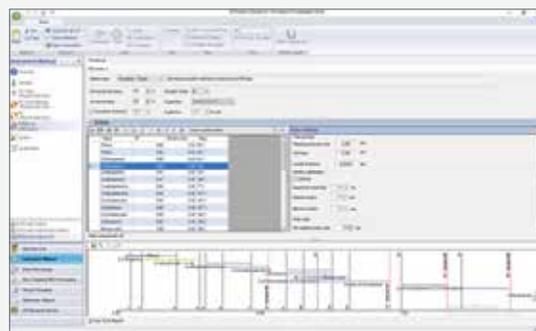
## Target analysis



### AutoSIM

AutoSIM allows you to acquire full-scan data, enter or import from external file (csv, Excel, LIMS database) your list of target analytes, and perform selection of the SIM ions from the FS data in a guided, automated fashion. A real time saver and productivity booster.

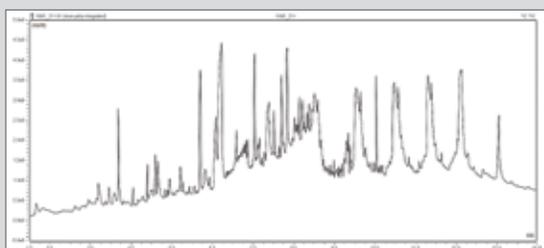
## Method Development



### Timed-SIM Method

Timed Acquisition (t-SIM) helps optimize the dwell times in SIM quantitation methods with large number of analytes, especially in case of co-elution, assuring the maximum sensitivity. However, a manual set up of t-SIM can be tedious. This is why AutoSIM is complementary to t-SIM, for a fully automated workflow.

## Untargeted screening



### Full-scan Acquisition

For untargeted analysis, leverage the easier and quick set up of a full-scan acquisition method, maintaining the analytical information of the entire mass range.

## Method Development



### Mass Spectral Deconvolution

Unravel the heaviest co-elution of the TIC chromatogram by reconstructing clean mass spectra for heavy co-eluted compounds, ready for reliable library searching and ID confirmation.

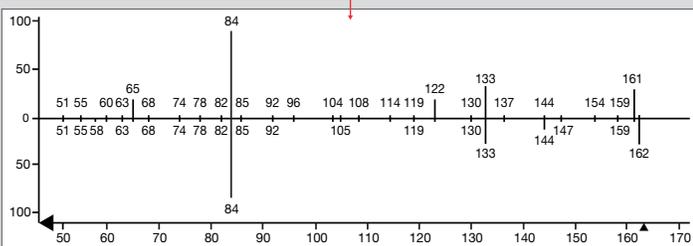
## Routine Analysis



### Retention Time Alignment (RTA)

The new RTA tool is a faster, more flexible and easier way to maintain retention times during routine operation of high-throughput GC-MS methods. The tool uses the measured void time of the column and the retention time of a reference substance to provide a new column length and internal diameter settings (or corrected pressure or flow value) to realign retention times of all the peaks of the chromatogram. This means that during a column change or trim, the user can quickly re-align their retention times and returning to collecting results.

## Routine Analysis



Mass Spectral Deconvolution (continued)



### SmartTune

SmartTune is the new simplified tuning tool for Thermo Scientific ISQ and TSQ™ instruments. This intuitive tool removes tuning complexity and ensures your system is performing at the level you require, ahead of running your samples. A simple guided interface efficiently checks and tunes the system, and intelligently eliminates any unnecessary steps in the process, resulting in faster tuning operations. If a problem is detected, SmartTune advises you on recommended corrective action. In addition, SmartTune allows user customizable targets to facilitate consistency in performance between analytical sequences.

# Unstoppable workflows

The constant pressure to increase productivity challenges laboratory staff at every level, from the technician to management. Streamlined, workflow-driven software solutions are needed to address these challenges. At the same time, the growing list of compounds that laboratories must quantify and screen, combined with increasingly complex regulatory requirements, necessitate flexible method development and powerful reporting tools.

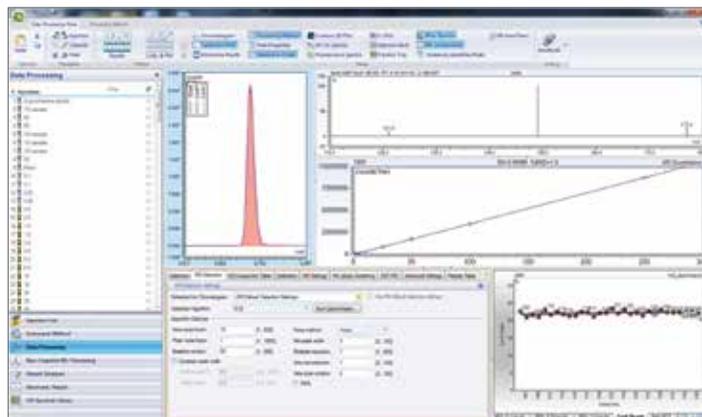
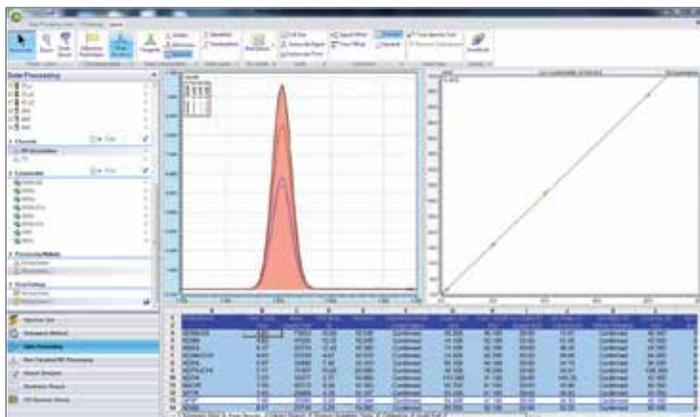
## Chromeleon CDS Software

Use Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software to control your entire chromatography lab. It is fully scalable from a single workstation to an enterprise-wide installation, and provides control of more than 350 modules from

Thermo Fisher Scientific™ and many other vendors, including support for quantitative mass spectrometry workflows for all separation techniques and mass spectrometry (MS) variants, all using the same intuitive user interface.

## Integrated control of mass spectrometry instruments

- A single software to streamline your chromatography and MS quantitation workflows
- Full integration of Thermo Fisher Scientific™ MS instruments using native control drivers
- Powerful features bring unrivalled usability, scalability and compliance benefits to MS users
- Data processing per component using MS-specific detection algorithms
- MS-specific views including Total Ion Chromatogram (TIC), Extracted-ion Chromatogram (XIC), Mass Spectra, quantitation channel, and MS component traces
- AutoSIM/AutoSRM for automated SIM/SRM method development
- Use your MS like any other routine detector



## Chromeleon XPS: Walk up and run

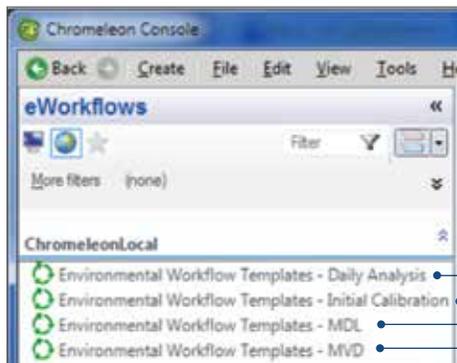
Thermo Scientific™ Chromeleon™ XPS Open Access software lets any untrained user run samples on their own using a streamlined walk-up interface while utilizing the full power of Chromeleon.

# Boost laboratory efficiency with operational simplicity and intelligent functionality

Take advantage of Thermo Scientific™ eWorkflows™ designed to simplify creating sequences of analyses.

Chromeleon was designed with scientists and technicians in mind. It simplifies repetitive tasks, reduces errors and helps you to achieve more 'right first time' analyses. These smart tools make your work faster and easier while ensuring reproducible, quality results.

- Reduce errors in sequence setup using eWorkflows
- Achieve more "right first time" analyses using and Intelligent Run Control
- Experience faster data processing, reviewing and reporting with dynamic updating and smart tools built in



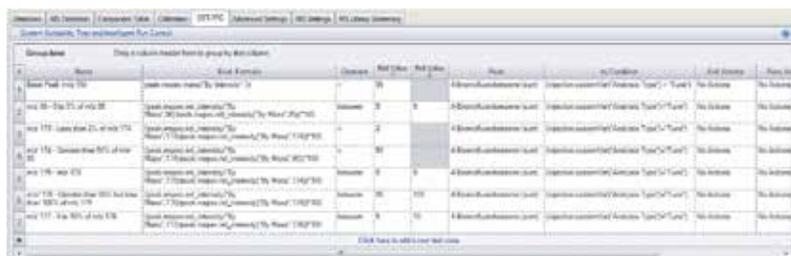
- Fixed Calibration, Check Standards, QC Samples, Unknowns
- Tune Check, Calibration Curve, QC Samples
- Fixed Calibration, Check Standards, Injections for computing Minimum Detection Level (MDL)
- Fixed Calibration, Check Standards, Injections for performing method validation



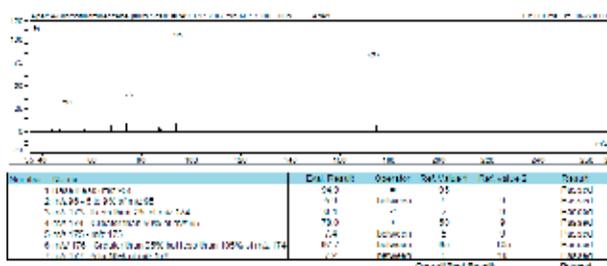
## Dedicated reporting for environmental analyses

The Environmental Analysis Extension Pack is a full set of predefined templates and methods dedicated to GC-MS environmental analysis to quickly and easily calculate results and generate fully compliant with the requirements of the United States (U.S.) Environmental Protection Agency (EPA).

More than 30 templates available to work with customized sequences and processing methods to report required information about analyses according to EPA requirements.



Automated MS Performance (DFTPP or BFB) Tune check according to U.S. EPA guidelines



## AppsLab Library: Jump start your method development

Find applications and download ready-to-use eWorkflows from Thermo Scientific™ AppsLab Library of Analytical Applications right into Chromeleon CDS where they can be directly executed.

# Unstoppable scalability

In an evolving environment, it is difficult to clearly see what challenges lie ahead with your analysis. In order to be ready for the future, choosing a flexible GC single quadrupole system can make all the difference. The ISQ 7000 GC-MS system has been designed to allow a full upgrade path from base to advanced configurations, boosting flexibility and performance anytime you need it.

## Make your investment future-proof

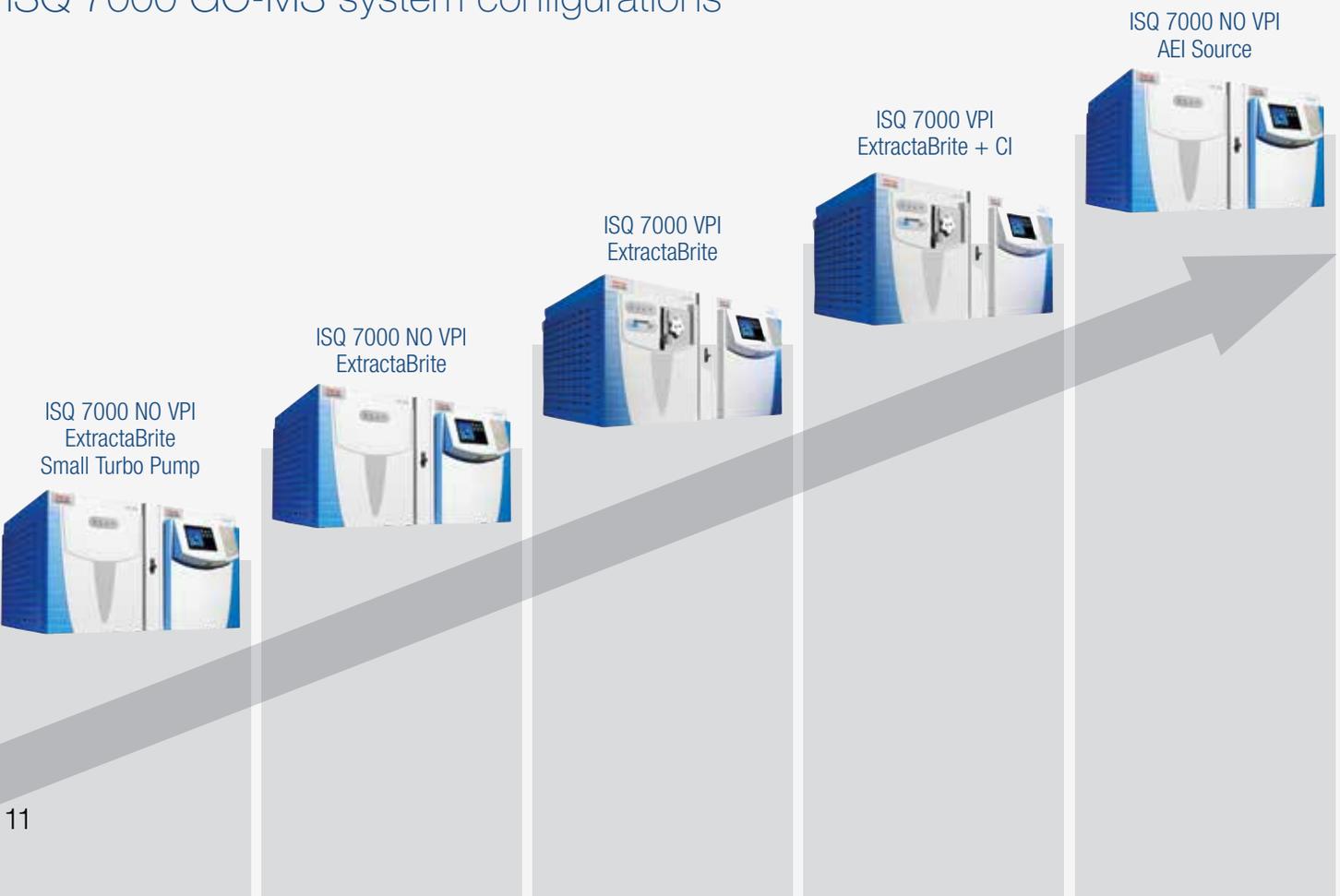
Whether you face budget constraints or you are uncertain about your future analytical needs or evolving regulatory requirements, you shouldn't compromise your investment.

With the ISQ 7000 GC-MS platform, you can leverage the fully scalable platform which offers 5 levels of performances and

price, with field-upgradable options. Now you can invest on an open, fit-for-purpose solution at the right cost.

All system configurations feature easy-to-use start-up tools like SmartTune, AutoSIM and t-SIM to facilitate adoption and method setup.

## ISQ 7000 GC-MS system configurations



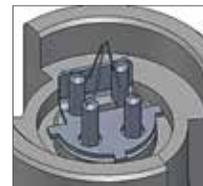


# Unstoppable design

## Unique Dual Filament Design

The ISQ 7000 GC-MS system offers a dual filament for extended operation and lifetime. The unique design of the filament ensures that both filaments offer similar analytical performance. The filaments are oriented in the same direction for improved

performance and are protected by an electron lens. Your analyses do not pay a price for switching from one filament to the next.

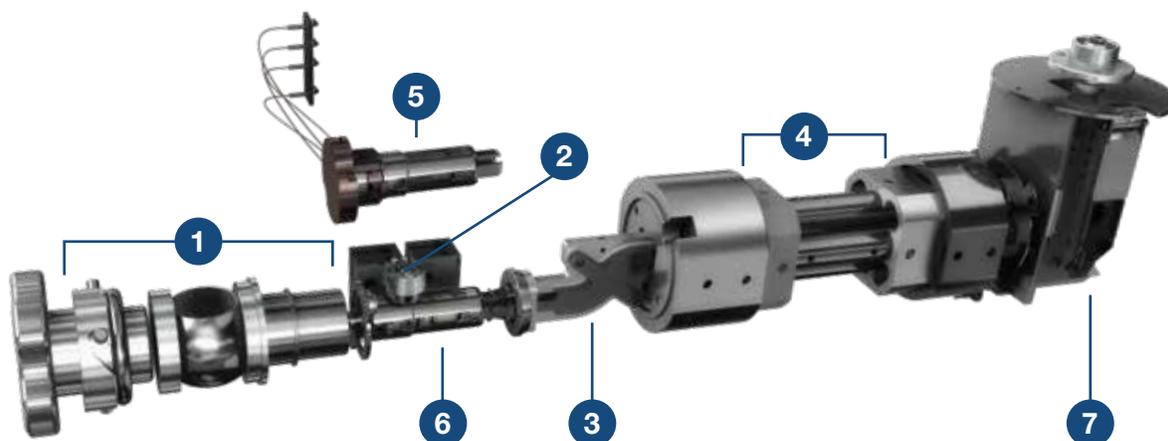


## Enhanced Transferline Design

The ISQ 7000 GC-MS system features an optimized GC-MS interface. This transferline evenly distributes heat across the length of the analytical column, ensuring that there are

no hot or cold spots, which in turn delivers Gaussian peak shapes, even for high-boiling compounds.

- 1 Optional Vacuum Probe Interlock (VPI) enables NeverVent technology
- 2 Unique Dual Filament design for extended operation and lifetime
- 3 S-shaped ion guide for off-axis ion optics, eliminates neutral noise
- 4 Solid, homogeneous non-coated, non-heated maintenance-free quadrupoles
- 5 Advanced Electron Ionization (AEI) source achieves ultimate sensitivity and robustness through a tightly controlled ion beam. Featuring RF lens technology. Available in a dedicated configuration.
- 6 High sensitivity ExtractaBrite ion source, featuring patented RF lens ensuring system matrix robustness. Part of the NeverVent system: removable under vacuum.
- 7 Triple off-axis DynaMax XR detection system, with off-axis 10 kV dynode, discrete dynode electron multiplier and electrometer with high linear range



**Ion sources and probes are removable without requiring a break in the vacuum, and they enable you to perform MS and MS/MS experiments on solids in real time while effortlessly switching between electron ionization (EI) and chemical ionization (CI).**

### Direct Insertion Probe (DIP)

Slower volatilization with heated capillary tube for solid samples. The DIP can be utilized for rapid analysis of solids or trace components in solid matrices such as forensic samples, tissue, etc.



### Direct Exposure Probe (DEP)

Rapid heating filament for liquids or solutions. The DEP is ideal for rapid molecular weight confirmation of solids dissolved or suspended in a suitable solvent.



### Chemical Ionization (CI)

Chemical ionization is a softer form of ionization than electron ionization (EI). It offers a greater opportunity to generate more abundant high mass and molecular ions and a higher degree of selectivity or sensitivity in the source ionization process, especially with negative chemical ionization (NCI), favoring electronegative compounds, such as halogenated species. Chemical ionization is ideally used for structure elucidation also in MS/MS mode.

# A step ahead in automated sampling

## Autosampling and Autoinjector Solutions

Improve the consistency and quality of your gas chromatography (GC) results with the Thermo Scientific™ AI 1310 Autoinjector and the Thermo Scientific™ AS 1310 Autosampler. Engineered to stand up to the demands of any low-medium throughput lab, the AI/AS 1310 Series autosampler will help you process your samples more quickly and cost-effectively with its advanced design and usability features.

Thermo Scientific™ AS 1310 Gemini kit is available to serve two channels on the Thermo Scientific gas chromatograph with simultaneous injections. Double the productivity of your sample throughput capabilities.



AI/AS 1310 Series Autosampler

## Robotic Sample Handling Solutions

A perfect match for the ISQ 7000 GC-MS system, the Thermo Scientific™ TriPlus™ RSH™ Autosampler utilizes robotic sample handling to expand automated capabilities beyond liquid, headspace, and solid-phase micro extraction (SPME) injections to advanced sample handling cycles. The innovative Automatic Tool Change (ATC) capability offers fully unattended operation for upmost productivity and flexibility. Your results benefit from improved precision and reproducibility, while your laboratory gains unique advantages from the system's unattended operations and sample handling flexibility.

Take advantage of the available ready-to-use prep cycles to automate the most common sample handling procedures such as dilution, internal standard addition, and derivatization. Or, open the opportunity for a fully customized workflow using the Thermo Scientific™ TriPlus™ RSH Sampling Workflow Editor software. Thanks to its intuitive visual programming capability, it is possible to easily program the TriPlus RSH autosampler to operate according to your needs.

Unique Clone Mode functionality is available to serve two GC or GC-MS instruments independently, with a single autosampler platform, for a compact and smart solution to you laboratory.



TriPlus RSH Autosampler

Robotic autosampler platform, the Thermo Scientific™ TriPlus™ 100 Liquid Sampler system is ideal for high sample throughput when only liquid injection is required. It is fully compatible with Thermo Scientific™ TriPlus™ RSH™ liquid accessories. Features upgradable vial capacity (from 162 up to 624 vials), and offers from nano to large volume injection capabilities along with flexible injection modes.

## Headspace Sampling Solution

For any high-throughput environment interested in the analysis of volatiles, static headspace-gas chromatography, with its simplicity and broad applicability, is one of the most reliable and robust techniques. The Thermo Scientific™ TriPlus™ 300 Valve-and-Loop Headspace Autosampler offers the largest capacity of the sample tray and incubation oven enabling users to quickly analyze a larger number of samples and achieve unparalleled productivity. The superior sample integrity and traceability, thorough sample path inertness, seamless integration into multiple chromatography data systems, and the immediate local user interface further expand the reliability, flexibility and applicability of the autosampler.



TriPlus 300 Headspace Autosampler



## Thermo Scientific Chromatography Columns and Consumables

Get the most out of the ISQ 7000 GC-MS system by pairing it with advanced, high-performance Thermo Scientific products. Our wide range of consumables and accessories offer customers applications-focused solutions in the environmental, food safety, toxicology, clinical, petrochemical, pharmaceutical and general analytical industries.

Learn more: [thermofisher.com/chromexpert](https://thermofisher.com/chromexpert)

- Thermo Scientific™ TraceGOLD™ Columns – low bleed, high reproducibility
- Consumables tested and certified on the Thermo Scientific™ TRACE™ 1300 Series GC systems
- Vials guaranteed for Thermo Scientific™ Autosampler systems
- Thermo Scientific™ GFM Pro Gas Flowmeter and Thermo Scientific™ GOLD Pro Gas Leak Detector for system installation and maintenance
- Derivatization reagents and Derivatization grade solvents

Find out more at [thermofisher.com/ISQ7000](https://thermofisher.com/ISQ7000)

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