



Mass spectrometry

# TSQ 9610 triple quadrupole GC-MS/MS system

## Unstoppable confidence in GC-MS/MS analysis

### Keywords

TSQ 9610, triple quadrupole, GC-MS/MS, Advanced Electron Ionization (AEI), ExtractaBrite, NeverVent technology, SmartTune, Vacuum Probe Interlock, Intelligent instrument health monitoring

### Performance benefits

- Detect low traces of target compounds/chemicals in difficult matrices or relieve matrix pressure on the analytical system with the Advanced Electron Ionization (AEI) source, available in dedicated configurations
- Remove tuning complexity with SmartTune, a simplified tuning tool
- Boost instrument productivity to unprecedented levels with the patented Thermo Scientific™ NeverVent™ technology
- Select from base to advanced configurations to increase flexibility and performance anytime you need it
- Allow method consolidation and increase instrument uptime with an extended dynamic range and long-lifetime detector

Analytical testing laboratories working in food, environmental, forensic/toxicology and pharma analysis need to ensure that they can meet regulatory requirements with confidence with every analysis. These labs need to be certain the instrument is always producing results and their workflows are not interrupted so that they can achieve a rapid return on their investment. In short, they need unstoppable confidence in their analytical systems.

The Thermo Scientific™ TSQ™ 9610 GC-MS/MS system is a triple quadrupole GC-MS platform designed to revolutionize laboratory productivity by delivering unprecedented levels of performance, ease-of-use, and uptime with the ultimate goal of facilitating the reduction of cost-per-sample in the high-throughput environment.

Unlike other systems, the TSQ 9610 GC-MS/MS offers laboratories the opportunity to select best-in-class SRM performance, even for high-capacity methods, whilst still benefiting from increased analytical robustness.

The TSQ 9610 GC-MS/MS system offers performance that addresses increasingly challenging regulatory requirements, as well as providing effective ease-of-use tools to deliver consistent, class leading results by both experienced and newer users.

## TSQ 9610 triple quadrupole GC-MS/MS system specifications

### Modes

- Electron Ionization (EI), with full-scan (FS), SIM, and FS/SIM simultaneous within sample injection, timed acquisition (t-SIM), and FS/t-SIM
- Multiple/Selected Reaction Monitoring (MRM/SRM), timed acquisition (t-SRM), combined SRM/FS, combined t-SRM/FS, product ion scan, precursor ion scan, neutral loss scan
- Ability to convert timed acquisition method (t-SIM/t-SRM) into general mode (segmented) method

### Ion source types

- Thermo Scientific™ ExtractaBrite™ Electron Ionization (EI) source, wireless, with dual filaments in all ionization modes (EI and CI), programmable to 350°C
- Thermo Scientific™ Advanced Electron Ionization (AEI) source, wireless, with dual filaments, programmable to 350°C (EI mode only)
- Chemical Ionization (CI) with Positive Ion Chemical Ionization (PCI) and Negative Ion Chemical Ionization (NCI) source and Combination EI/PCI/NCI source, available with the ExtractaBrite ion source

### NeverVent technology

- Available on the ExtractaBrite and AEI source configurations; using the vacuum probe interlock (VPI) and the V-Lock source plug, planned maintenance such as column exchange and source cleaning can be performed without venting the mass spectrometer
- On the TSQ 9610 VPCI configuration, ionization modes can be switched
- On the NeverVent AEI system, the filament can be replaced without the need to break instrument vacuum; these unique features mean that you will have unstoppable confidence that your instrument is always productive

### Software features

- Automated SRM Development (AutoSRM)
- SIM Bridge—a tool used to import SIM and SRM acquisition tables in comma-separated-values (CSV) formats into AutoSRM and instrument method
- Automated acquisition window adjustment based on retention time
- Compound based acquisition method setup
- Customizable automated tuning
- Retention Time Alignment—this tool uses column void time and retention time of a reference substance to provide a new column length and internal diameter (or corrected pressure or flow value) to realign retention times of all the peaks of the chromatograms
- SmartTune—an intelligent and simple tuning tool
- Thermo Scientific™ SmartStatus™ intelligent software:
  - Data-driven instrument monitoring utilizing historical trends and user notifications to ensure maintenance is performed when required and avoid unnecessary instrument downtime

### Mass analyzer

- Heated, off-axis ion guide (Quadrupole pre-filter, Q0), for noise reduction and solid, homogeneous, non-coated, maintenance-free quadrupole rods
- Fast quadrupole scanning, up to 20,000 u/s

### Mass resolution and mass stability

- Automatic tuning down to 0.4 u and manual tuning
- Selectable SRM resolution settings in method at autotune preset values of 0.7 u, 1.5 u and 2.5 u or custom tune from 0.7–1.5 u
- Mass stability better than 0.1 u/48 hours/ $\Delta T \leq 2$  K

### Collision energy range

- 0–60 eV

### Mass range

- 1.2–1,100 u with unit mass resolution

### Detector

- Thermo Scientific™ XLXR™ detection system with off-axis 10 kV dynode, discrete dynode electron multiplier and electrometer, linear range of  $> 10^7$  (0–110  $\mu$ A)
- Electronic dynamic range  $> 10^9$

### Scan speed and acquisition rate

- Up to 20,000 u/s
- Ability to acquire more than 97 scans/s in FS when scanning over a range of 125 u
- 0.5 ms minimum SRM dwell times
- Up to 800 SRM transitions/s

## Pumping systems

- High-capacity large (>300 L/s), dual-stage turbomolecular pump
- Optional medium-capacity (>240 L/s), dual-stage turbomolecular pump
- Mechanical rotary vane 3.3 m<sup>3</sup>/h oil pump
- Foreline convectron gauge
- Optional oil-free scroll pump (11.4 m<sup>3</sup>/h)
- Ion gauge (optional)
- Pumping system is compatible with helium, hydrogen, and nitrogen carrier gases

## Electron energy

- Adjustable up to 150 eV dependent on ion source type

## Emission current

- Up to 350  $\mu$ A

## Transfer line temperature

- Up to 400°C

## TSQ 9610 carrier gas options

The TSQ 9610, with ExtractaBrite or AEI ion source, can easily operate with helium as well as with hydrogen carrier gas for ultimate sustainable operations. When combined with the Thermo Scientific™ HeSaver-H2Safer option for the Thermo Scientific™ iConnect™ SSL inlet, it is possible to significantly limit the carrier gas consumption, reducing costs, mitigating helium shortage issues and removing safety risks when hydrogen is used.

## Microfluidics options for Thermo Scientific™ TRACE™ 1600/1610 GC systems

Dual-column, dual-detector or heart-cut 2D-GC configurations are achieved with highly inert microfluidic connectors based on the SGE SilFlow™ technology featuring FingerTite metal ferrules for easy-to-install, zero-dead volume, and leak-free connections.

- Compatible with capillary columns in the range of 0.32–0.1 mm I.D.
- Software assistant is available to support heart-cut 2D-GC method setup

## Direct sample probe system option (VPICI enabled systems only)

- Switch to probe in < 3 min. with GC undisturbed
- Available in two styles: rapid heating filament Direct-Exposure Probe (DEP, capable of flash vaporization or pyrolysis at up to 1,600°C) or slower volatilization Direct-Insertion Probe (DIP, capable of accommodating powders and solid samples in a quartz or aluminum crucible with heating up to 450°C)

## Data system software and options

- Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) software for chromatographers using MS, a common platform for GC, GC-MS, LC, LC-MS, IC, and IC-MS quantification
- Thermo Scientific™ TraceFinder™ software, a common platform for routine GC, GC-MS, LC, and LC-MS quantification
  - TraceFinder software for environmental and food safety, with compound database of over 1,300 pesticide SRM transitions
- Retention time alignment tool to easily and quickly maintain retention time during routine operation
- Instrument control and data connection via Ethernet
- Virtual instrument interface for TRACE 1600 Series GC systems (optional)
- Computer supplied with instrument equipped with three Ethernet (8P8C RJ-45) ports
- Commercial mass spectral library (latest edition) options, including:
  - NIST Mass Spectral Library with RI and MS/MS
  - Wiley Mass Spectral Library
  - Maurer/Pfleger/Weber Mass Spectral Library for drugs, poisons, pesticides, pollutants and their metabolites

## Performance specifications

GC triple quadrupole mass spectrometers are most frequently applied to trace quantitative analysis in complex matrix. This means that the ability of the system to select against matrix (reduce chemical noise) is a critical performance factor to be taken into consideration. To get an accurate representation of instrument performance, instrument detection limits (IDLs) can be used to demonstrate low-level precision and provide the complete performance picture.

## AEI installation specifications

In SRM mode, with He carrier gas and either the Thermo Scientific™ AI/AS 1610 Series Autosampler, Thermo Scientific™ TriPlus™ 100 LS Liquid Autosampler, or TriPlus™ RSH Autosampler\* (required and configured for liquid injections), eight sequential 1 fg Octafluoronaphthalene (OFN) splitless injections monitored for SRM 272/222 produce the following instrument detection limit (IDL), calculated from the chromatographic peak area with 99% confidence interval: IDL  $\leq$  0.3 fg.

\* In the case that an autosampler is not present at install, a single injection of 1 fg OFN will be run to demonstrate the S/N reference specification with Helium as carrier gas. Demonstration of IDL specification with Hydrogen carrier gas requires an autosampler.

## Installation specifications

Source type	Turbopump	S/N or IDL with He carrier gas
AEI*	Large	≤ 0.3 fg
ExtractaBrite, EI**	Large	≤ 2 fg
ExtractaBrite, EI**	Medium	≤ 4 fg
ExtractaBrite, PCI***	Large	2,500:1
ExtractaBrite, NCI****	Large	10,000:1

All IDL verifications require an autosampler and use helium carrier gas

\* Eight sequential 1 fg OFN splitless injections

\*\* Eight sequential 5 fg OFN splitless injections

\*\*\* 1 µL of 5 pg/µL benzophenone (BZP) transition from 183 → 105 using methane as reagent gas in PCI mode

\*\*\*\* 1 µL of 100 fg/µL OFN (*m/z* 272) using methane as reagent gas in NCI full scan mode

## Reference specifications

Ion source/concentration	Turbopump	S/N or IDL with He carrier gas
AEI IDL Eight sequential injections of 1 fg OFN splitless injection	Large	≤ 0.16 fg
ExtractaBrite IDL Eight sequential injections of 2 fg OFN splitless injection	Large	≤ 1 fg
AEI SRM 100 fg OFN* ( <i>m/z</i> 272 → 222)	Large	≥ 30,000:1
ExtractaBrite EI SRM 100 fg OFN ( <i>m/z</i> 272 → 222)	Large	≥ 20,000:1
ExtractaBrite EI SRM 100 fg OFN ( <i>m/z</i> 272 → 222)	Medium	≥ 6,000:1
NCI Full-Scan** 100 fg OFN ( <i>m/z</i> 272)	Large	≥ 10,000:1
PCI SRM** 5 pg BZP ( <i>m/z</i> 183 → 105)	Large	≥ 5,000:1

Not tested at installation by default; tested only if specifically requested for

\* Tested as 1 fg OFN to give S/N of 300:1

\*\* Using methane as reagent gas

Configuration for analysis using hydrogen carrier gas as an alternative to helium has several benefits including reduction in operation cost, sustainable supply and optimal chromatography conditions. The TSQ 9610 with the AEI source has been fully tested using hydrogen carrier gas and is the recommended configuration.

## Hydrogen carrier gas specifications<sup>^</sup>

Recommended Configurations for Hydrogen carrier gas - TSQ 9610 AEI or TSQ 9610 NVAEI		
8 sequential injection for OFN at 5 fg on column	Installation specification, IDL	Reference specification, IDL
		≤ 2 fg

TSQ 9610 ExtractaBrite systems with Large turbomolecular pump		
Installation EI specification (S/N)	Installation PCI specification (S/N)	Installation NCI specification (S/N)
≥ 4000:1*	≥ 830:1**	≥ 3300:1***

<sup>^</sup> The hydrogen carrier gas specifications will be tested at installation only when the system is ordered with the hydrogen carrier gas kit

\*EI SRM 100 fg OFN (*m/z* 272 → 222)

\*\*PCI SRM 5 pg BZP (*m/z* 183 → 105) using methane as reagent gas

\*\*\*NCI Full-Scan 100 fg OFN (*m/z* 272) using methane as reagent gas

## System dimensions/weights

Equipment	Dimensions (height × width × depth)	Weight
Mass Spectrometer	44 × 40 × 89 cm (17.5 × 16 × 35 in.)	61 kg (135 lbs.)
TRACE 1600GC	45 × 44 × 60 cm (18 × 17 × 24 in.)	35 kg (77 lbs.)*
TRACE 1610 GC	45 × 44 × 67 cm (18 × 17 × 26 in.)	35 kg (77 lbs.)*

\* Plus 0.8 kg (1.7 lb) each iConnect injector or detector module

## Instrument configurations

Instrument	Source option	Extended dynamic range and lifetime detector	Vent free source exchange	Vent free column exchange	Vent free filament exchange	Use of direct probes
TSQ 9610 Medium turbo	El ExtractaBrite	✓	×	×	×	×
TSQ 9610 Advance electron ionization (AEI)	Advanced electron ionization (AEI) source	✓	×	×	×	×
TSQ 9610 NeverVent AEI	NeverVent AEI source	✓	✓	✓	✓	×
TSQ 9610 Vacuum probe interlock (VPI)	El ExtractaBrite/ CI ExtractaBrite	✓	✓	✓	×	✓

Learn more at [thermofisher.com/TSQ9610](https://thermofisher.com/TSQ9610)

**General lab equipment, not for clinical, patient or diagnostic use.** ©2025-2025 Thermo Fisher Scientific Inc. All rights reserved. All trademarks are the property of Thermo Fisher Scientific and its subsidiaries unless otherwise specified. This information is presented as an example of the capabilities of Thermo Fisher Scientific Inc. products. It is not intended to encourage use of these products in any manners that might infringe the intellectual property rights of others. Specifications, terms and pricing are subject to change. Not all products are available in all locations. Please consult your local sales representative for details. **PS-004102-NA-EN 0925**