Mass spectrometry

PRODUCT SPECIFICATIONS

ISQ 7610 single quadrupole GC-MS system

Unstoppable confidence in GC-MS analysis

Keywords: ISQ 7610, single quadrupole, GC-MS, Advance Electron Ionization (AEI), ExtractaBrite, NeverVent technology, SmartTune, Vacuum Probe Interlock (VPI)

Performance benefits

- High sensitivity in full scan and SIM acquisition mode for trace detection levels of both targeted and untargeted analytes, with the Thermo Scientific™ ExtractaBrite™ ionization source. Increased sensitivity available with the Advanced Electron Ionization (AEI) Source in a dedicated configuration.
- Remove tuning complexity with SmartTune, a simplified tuning tool to easily maintain consistent response over time for longer.
- Boost instrument productivity to unprecedented levels with the patented NeverVent™ technology.

- Select from a fully upgradeable path, from base to advanced configurations, to increase flexibility and performance anytime you need it.
- Allow method consolidation and increase instrument downtime with an extended dynamic range and lifetime detector.

Analytical testing laboratories working in food, environmental and forensic/toxicology analysis need to produce reliable results for every user and meet the regulatory needs. These labs need to ensure 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 their analytical systems to provide unstoppable confidence.

The Thermo Scientific™ ISQ™ 7610 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 7610 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 7610 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.

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

ISQ 7610 single quadrupole GC-MS system specifications

Modes

- Electron Ionization (EI), Chemical Ionization (CI), with full-scan (FS), SIM, and FS/SIM simultaneous within sample injection
- AutoSIM and timed acquisition (t-SIM)

Ion source types

- Thermo Scientific™ ExtractaBrite™ Electron Ionization (EI) source with dual filaments in all ionization modes, programmable to 350 ˚C
- Thermo Scientific™ Advanced Electron Ionization (AEI) source programmable to 350 ˚C EI only operation, with dual filaments assembly
- Optional Chemical Ionization (CI) with Positive Ion Chemical Ionization (PCI) and Negative Ion Chemical Ionization (NCI) dedicated ion volume or combined EI/ PCI/NCI ion volume to conduct EI and CI experiments within the same analysis

NeverVent technology

- Exclusively available on VPI-enabled systems, V-Lock isolates the vacuum region of the mass spectrometer from the column–this enables an industry exclusive method to change GC columns quickly, with no venting required
- Optional Vacuum Probe Interlock (VPI) removes the entire ExtractaBrite source for maintenance or to change ionization modes without venting (available on ISQ 7610 GC-MS system with VPI configuration)

Mass filter and mass analyzer

- Dual-stage mass filter with off-axis ion guide pre-filter for noise reduction and solid, homogeneous non-coated, maintenance-free quadrupole rods
- Patented RF lens embedded in the ion source to protect the quadrupole from ion burning
- Fast quadrupole scanning up to 20,000 u/s

Mass stability

- Better than 0.1 u/48 hours/ΔT ≤2 K

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 µA)
- Electronic dynamic range $>10^9$

Mass range

- 1.2–1,100 u with unit mass resolution

Acquisition rate

- Ability to acquire more than 240 scans/s in SIM
- Ability to acquire more than 97 scans/s in FS when scanning over a range of 125 u

Pumping systems

- High-capacity (>300 L/s), dual-stage turbomolecular pump
- Mechanical rotary vane 3.3 m^3/h oil pump
- Optional oil-free scroll foreline pump
- Standard-capacity (66 L/s) turbomolecular pump

CI reagent gas capabilities

- Software-switchable dual reagent gas with digital flow control on a sample-by-sample basis
- Ammonia, methane, isobutane or specialty mixes of these gases and CO_2 presets
- PPINICI (pulsed positive ion negative ion chemical ionization) to switch on a scan-to-scan basis between positive and negative ionization mode

Electron energy

- Adjustable up to 150 eV dependent on ion source type

Emission current

- Up to 350 µA

Transfer line temperature

- Up to 400 ˚C

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 Thermo Scientific™ 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 (VPI 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 solid samples in a quartz or aluminum crucible) 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 packages for Environmental and Food Safety, Clinical Research, and Forensic/Toxicoloy
- Retention Time Alignment tool easily and quickly maintains retention time during routine operation
- Instrument control and data connection via Ethernet
- Multi-functional icon-based GC touch screen on TRACE 1610 GC configuration or minimized local interface with the TRACE 1600 GC configuration
- 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
- Instrument health and monitoring:
  - Local PC utilization counters, historical trendlines and notifications
  - Remote preventative and corrective action notifications via Almanac

AEI installation specifications

In EI SIM mode, with He carrier gas and either the Thermo Scientific™ AI/AS 1610 Autosampler, Thermo Scientific™ TriPlus™ 100 LS Liquid Autosampler, or TriPlus™ RSH/ RSH SMART Autosampler‡ (required and configured for liquid injections), eight sequential 5 fg OFN splitless injections monitored for *m/z* 272 produce the following instrument detection limit (IDL), calculated from the chromatographic peak area with 99% confidence interval: IDL ≤1 fg†.

Standard installation and factory specifications* for the ISQ 7610 GC-MS system

Ion source/concentration	He†	H_2†
With AEI, 1 µL of 100 fg/µL OFN will produce the following minimum signal-to-noise (S/N) for *m/z* 272 when scanning 50–300 u	300:1	NA
With ExtractaBrite EI, 1 µL of 1 pg/µL OFN will produce the following minimum S/N for *m/z* 272 when scanning 50–300 u	2,000:1	100:1
In PCI mode, 1 µL of 100 pg/µL benzophenone will produce the following minimum S/N for *m/z* 183 when scanning 80–230 u using methane reagent gas	300:1	300:1
In NCI mode, 2 µL of 100 fg/µL OFN will produce the following minimum S/N for *m/z* 183 when scanning 50-300 u using methane reagent gas	2,000:1	600:1

* He (H_2) standard specifications are performed using a 15 (30) m × 0.25 mm ID × 0.25 µm System Qualification Column (SQC). The installation specifications are performed with either He or H_2 but not both.
† IDL and S/N vary based on configuration purchased, the most sensitive ISQ 7610 configuration can yield this IDL and S/N.
‡ In the case that an autosampler is not present at install, a single injection of 100 fg OFN will be run to demonstrate the S/N install spec.

System dimensions/weights

Equipment	System Dimensions (height × width × depth)	Weight
Mass spectrometer	44 × 33 × 63 cm (17.5 × 13 × 24.5 in)	43 kg (94 lbs)
TRACE 1600 GC system	45 × 44 × 60 cm (18 × 17 × 24 in)	35 kg (77 lbs)
TRACE 1610 GC system	45 × 44 × 67 cm (18 × 17 × 26 in)	35 kg (77 lbs)

Instrument configurations

Instrument	Source option	Extended dynamic range and lifetime detector	Vent free source exchange	Vent free column exchange	Use of direct probes
ISQ 7610 small turbo	EI ExtractaBrite	✓	×	×	×
ISQ 7610 NOVPI	EI ExtractaBrite	✓	×	×	×
ISQ 7610 Vacuum probe interlock (VPI)	EI ExtractaBrite	✓	✓	✓	✓
ISQ 7610 VPICI	EI ExtractaBrite/ CI ExtractaBrite	✓	✓	✓	✓
ISQ 7610 Advance electron ionization (AEI)	Advance electron ionization (AEI) source	✓	×	×	×

Learn more at **thermofisher.com/ISQ7610**

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