

Xevo TQ-GC

The Xevo™ TQ-GC is a sensitive, robust, accessible tandem quadrupole EI and (optional) CI GC-MS/MS analytical platform, able to routinely achieve required detection limits of complex samples. The ionization source and transfer optics are designed to be able to cope with the rigour of complex sample analysis and high matrix background without frequent removal and cleaning.

Following the design principle of poka-yoke or 'mistake-proofing' user-serviceable components are designed to only fit one way to prevent mistakes and allow replacement or cleaning of parts to be quick, simple, and require little training.

The use of System Health Check, Auto-tune enables less experienced MS users to set-up, optimize and prepare the system for analysis. This also means consistency in operation and reduction in loss of samples due to incorrect instrument set-up. Xtended Dynamic Range™ (XDR) technology provides accessible sensitivity and method transfer.

Using RADAR,™ which enables rapid switching between MS full scan and MS/MS acquisition modes, analysts can get more from their MS/MS analysis. RADAR enables NIST library searchable spectra to be generated alongside MRM data, meaning simplified method development and background or interference identification.

SYSTEM HARDWARE SPECIFICATIONS

Ionization sources	EI standard, CI optional Tool free EI to CI and tool free ion source change for cleaning
User centric source design	Easily assembled source designed to be tolerant for complex matrices Rapid source chamber removal and ionization mode change One-click complete system shutdown for any routine maintenance User changeable internal calibrant Source temperature limited to 250 °C to avoid excess fragmentation while retaining high chromatographic performance
EI filaments	Dual EI Yttrium-coated long-lasting filaments
Electron energy	Range 10–200 eV
Pump down time	Can pump down cold, vented instrument to working pressure (3e ⁻⁵ mBar) and get to temperatures (250 °C source and 350 °C transfer line) in 15 minutes
Ion Source Transfer Optics	Innovative user-centred design and are only able to be assembled one way, reducing training time and errors in re-assembly
Mass analyzer	Two high resolution, high stability quadrupole analyzers (MS1/MS2), plus pre-filters to maximize resolution and transmission while preventing contamination of the main analyzers
Collision cell	Innovative curved T-Wave™ which blocks meta-stable helium ions and neutral molecules reducing baseline noise. The T-Wave collision cell is assigned for optimal MS/MS performance at high data acquisition rates, with a minimal performance loss
Detector	Low noise, off axis, long life photomultiplier detector
Vacuum system	One split-flow air-cooled vacuum turbomolecular pump evacuating the source and analyzer; one vacuum backing pump

Dimensions	Width: 97.0 cm (38.2 in), inclusive of GC and MS Height: 59.3 cm (23.3 in) Depth: 91.3 cm (36.0 in)
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Regulatory approvals/marks	CE and NRTL
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AGILENT 8890 GC

Injector	Split/splitless multi-mode inlet, PTV and others
Autosampler	Agilent 7693 (liquid injection) or CTC PAL 3 (liquid injection, headspace or SPME analysis)
Oven temperature	Ambient +4 to 450 °C
Oven ramps/plateaus	Supports 20 oven ramps and 21 plateaus. Negative ramps are allowed
Ramp rate	120 °C/min (200 +V), 75 °C/min (120V)
Capillary flow technology	Effluent splitting, backflushing, column switching

SYSTEM SOFTWARE SPECIFICATIONS

Software	Systems supported on MassLynx™ version 4.2; TargetLynx™ XS Application Manager is included as standard
IntelliStart™ Technology	This system is designed to be easily accessible and will automatically perform source tuning, mass resolution, and calibration from a reference compound. In addition there are multiple system health checks for temperatures, filament settings, peak shapes, peak resolutions, peak positions, peak ratios, and instrument vacuum
Quantification methods database	Quanpedia™ – a database for storing and sharing user defined GC/MRM acquisition methods and associated processing methods for the targeted quantification of named compounds is provided as standard; database entries for a number of applications are also provided as standard
Automated MRM scheduling (acquisition rate assignment)	Dwell time, inter-channel delay time, and inter-scan delay time for individual channels in a multiple MRM experiment can be automatically assigned (using the Auto-Dwell feature) to ensure that the optimal number of MRM data points per chromatographic peak is acquired. The Auto-Dwell feature can dynamically optimize MRM cycle times to accommodate retention time windows that either partially or completely overlap. This greatly simplifies MRM method creation, irrespective of the number of compounds in a single assay, while at the same time ensuring the very best quantitative performance for every experiment
Automated MRM scheduling (acquisition window assignment)	Multiple MRM experiments can be scheduled (manually or automatically using the database) using retention time windows to optimize the cycle time for each MRM channel monitored. If required, MRM retention time windows can overlap partially or completely. This ensures that MRM data acquisition rates will be optimal for the quantification of all analytes in a given assay

PERFORMANCE SPECIFICATIONS

Acquisition modes	Full scan MS Product ion scan Precursor ion scan Selected ion recording (SIR) Multiple reaction monitoring (MRM) Simultaneous full scan and MRM (RADAR)
Product ion confirmation (PIC) mode	MRM acquisition acts as an automatic trigger for the acquisition of product ion spectra
RADAR	An information rich acquisition approach that allows you to collect highly specific quantitative data for target analysis while providing NIST-searchable full scan spectra in parallel
Mass range	2-1250 <i>m/z</i>
Scan speed	Up to 20,000 Da/s Examples of achievable acquisition rates: 20 scans per second (<i>m/z</i> 50 to 1000) 40 scans per second (<i>m/z</i> 50 to 500)
Mass stability	Mass drift is <0.1 Da over a 24 hour period
Linearity of response	The linearity of response relative to sample concentration, for a specified compound, is six orders of magnitude from the limit of detection
MS to MS/MS switching time	3 ms
MRM acquisition rate	Maximum acquisition rate of 500 MRM data points per second; Minimum dwell time of 1 ms per MRM channel; Minimum inter-channel delay of 1 ms; At an MRM acquisition rate of 500 MRM data points per second there is no more than 20% loss in signal compared to 50 MRM data points per second
Inter-channel cross talk	The inter-Channel cross talk between two MRM transitions will be less than 0.001% (less than 10 ppm)
Number of MRM channels	Up to 32,768 MRM channels (1024 functions, 32 channels per function) can be monitored in a single acquisition
Mass resolution	Automatically adjusted (IntelliStart) to desired resolution; (0.50 Da, 0.75 Da, 1.00 Da FWHM, or custom set-up)
MRM IDL (EI)	The instrument has an Instrument Detection Limit (IDL) of less than 4 fg of OFN from 8 consecutive injections
MRM sensitivity (EI)	1 μL of 10 fg/ μL octafluoronaphthalene will give a chromatographic signal-to-noise greater than 1600:1 for the transition of <i>m/z</i> 272>222
MRM sensitivity (PCI)	1 μL of 100 fg/ μL benzophenone will give a chromatographic signal-to-noise greater than 80:1 for the transition of <i>m/z</i> 183>105
Scanning sensitivity (EI)	1 μL of 1 pg/ μL of octafluoronaphthalene will give a chromatographic signal-to-noise greater than 300:1 for the EIC of <i>m/z</i> 272 when scanning from <i>m/z</i> 50 to <i>m/z</i> 550
SIR sensitivity (NCI)	1 μL of 100 fg/ μL octafluoronaphthalene will give a chromatographic signal-to-noise greater than 2000:1 for <i>m/z</i> 272

It should be noted that the above are not all standard installation specifications. The Xevo TQ-GC will be installed to the above MRM IDL (EI) specification and tested in accordance with standard performance tests as detailed in Waters document (Xevo TQ-GC Installation Checklist). Test criteria are routinely reviewed to ensure quality is maintained and are therefore subject to change without notice. See Site Preparation Guide and Product Release Notes for additional product and specification information.

Waters

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