Mass spectrometry

Sensitive. Selective. Smart.

Thermo Scientific™ Orbitrap Exploris™ GC S Mass Spectrometer

Performance benefits

- Premium quantitative and qualitative performance with the fast-scanning High-Field Thermo Scientific™ Orbitrap™ Mass Analyzer
- Sensitive and robust Thermo Scientific™ NeverVent™ Advanced Electron Ionization Source (AEI)
- Best-in-class mass accuracy, sensitivity, and dynamic range for quantitative certainty
- Selective 60,000 mass resolving power, enabling compound detection in complex matrices
- Thermo Scientific™ NeverVent™ technology for vent-free ion source and column exchange
- Compatible with Thermo Scientific™ Chromeleon™ Chromatography Data System (CDS) with dioxin eWorkflow

The Thermo Scientific™ Orbitrap Exploris™ GC S Hybrid Quadrupole-Orbitrap™ Mass Spectrometer expands the Orbitrap Exploris GC series, combining proven hardware and software from next-generation Thermo Scientific™ instruments. Built on the trusted Orbitrap Exploris platform and utilizing the Advanced Electron Ionization (AEI) source, the compact Orbitrap Exploris GC S mass spectrometer enhances high-resolution accurate mass (HRAM) capabilities to deliver precise results and modernize POPs workflows.

Designed for environmental and food safety labs analyzing dioxins, pesticides, and other POPs, the Orbitrap Exploris GC S mass spectrometer delivers greater scope, sensitivity, and selectivity to ensure confident, defensible results. Its robust, easy-to-use design boosts throughput, meets regulatory targets, and lowers analysis costs.

Ideal for routine quantitation, screening, and complex profiling, the Orbitrap Exploris GC S mass spectrometer provides deep analytical insight with exceptional accuracy and reproducibility. Intuitive operation and smart informatics reduce complexity and empower users at every level.

Adapt with ease to changing regulations and evolving analytical needs through method consolidation—all while maintaining top-tier performance and uptime.

Hardware features

Ion source

- NeverVent Advanced Electron Ionization source (AEI), wireless, with dual filaments, programmable to 350 °C
- Optimized electron energy at 50 eV in Auto Tune for all applications. Manual up to 150 eV
- Remove entire ion source in under 2 minutes without venting
- Vent-free column exchange with patented source plug

Ion optics

Advanced active beam guide (AABG)

Axial field reduces noise by preventing neutrals and high-velocity clusters from entering the quadrupole mass filter using double bent design geometry

Advanced quadrupole technology (AQT)

- Segmented quadrupole mass filter for precursor ion selection with variable precursor isolation width from 0.4 to 1,200 Da
- SIM precursor ion selection with high transmission from *m/z* 30 to 2,000

Automatic gain control (AGC)

Reliable AGC measurements for controlled injection of the number of ions

Orbitrap mass analyzer

- High-field Orbitrap mass analyzer
- Low noise detection pre-amplifier
- 4 kV central electrode voltage

Vacuum system

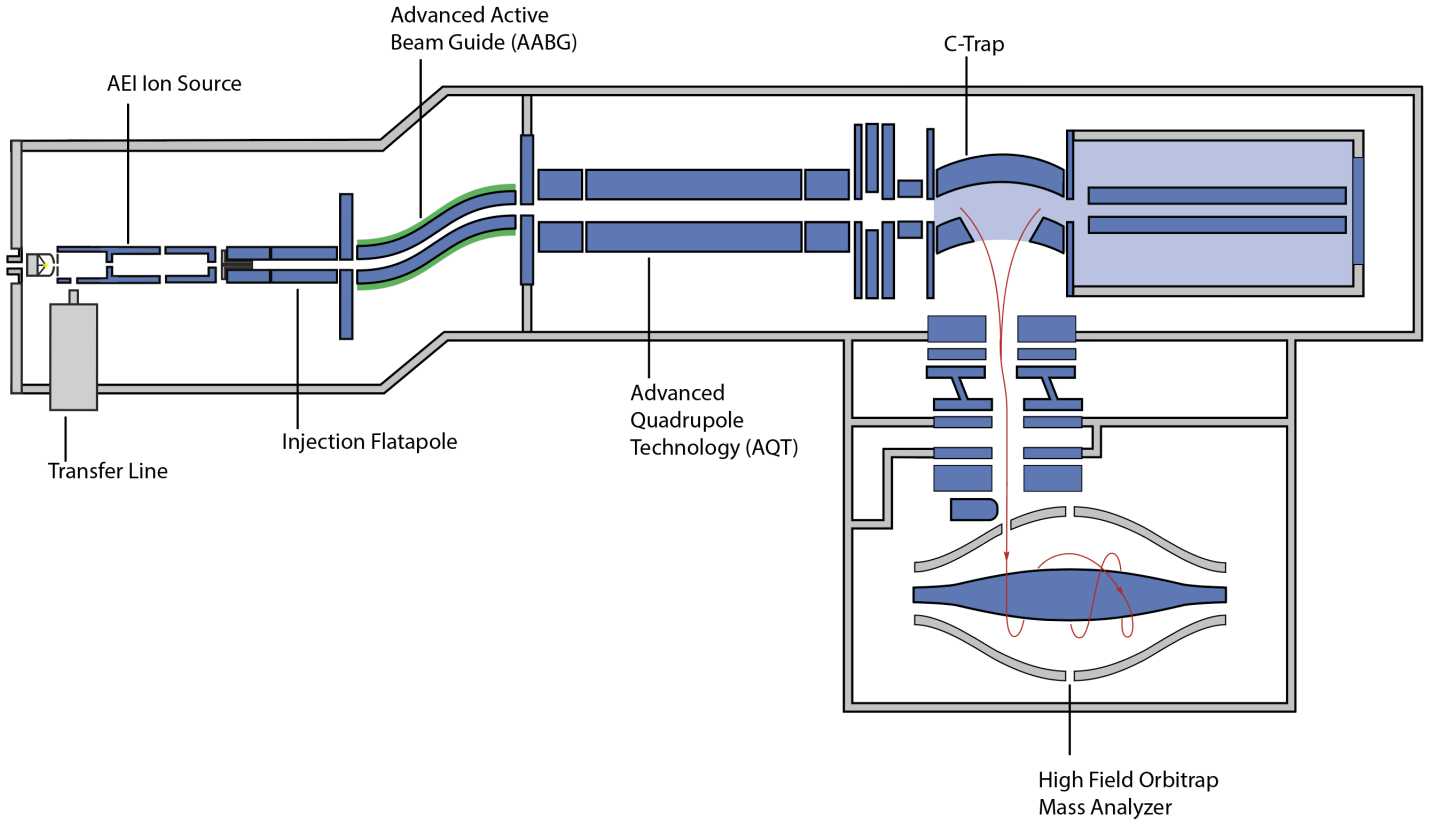
- A compact single turbo pump design providing adequate vacuum in five stages for the aluminum high-vacuum analyzer chambers
- Advanced vacuum technology reduces pressure in the ultra-high vacuum regions, enhancing transmission of ions to the Orbitrap mass analyzer

Data acquisition system

Data system

- High-performance PC with Intel™ microprocessor
- High-resolution LED color monitor
- Microsoft™ Windows™ 11 Enterprise (Long Term Service version) operating system
- High-speed real-time data acquisition and instrument control
- Automatic calibration of all ion transfer and analysis parameters via instrument control software

Orbitrap Exploris GC S mass spectrometer ion path



Performance specifications	
Mass range	*m/z* 30–3,000
Orbitrap mass analyzer resolution	Up to 60,000 at *m/z* 200
Scan rate*	Up to 40 Hz at resolution setting 7,500 at *m/z* 200
Mass accuracy*	External calibration achieves <3 ppm RMS drift over 24 hours Internal lock mass calibration achieves <1 ppm RMS drift over 24 hours
Instrument sensitivity	EI Instrument detection limit (IDL): EI IDL ≤2.5 fg OFN, derived at the 99% confidence level from 8 consecutive 1 µL injections of 5 fg OFN**
Dioxin sensitivity	Native 2,3,7,8-TCDD (*m/z* 321.8930): 20 fg on column***, within 5 ppm extraction window
Dynamic range	$>10^6$ analytical dynamic range* >5,000 within a single Orbitrap mass analyzer spectrum
Multiplexing	Up to 20 ions per scan

* Under defined conditions

** Demonstrated at installation with purchase of a liquid autosampler and Orbitrap Exploris GC system together with IQ/OQ

*** Under defined conditions and demonstrated at installation with purchase of 2,3,7,8-TCDD standard

Orbitrap Exploris instrument control software

- Tune application for instrument mass and system calibrations and checks, diagnostics, and manual data acquisition
- Method Editor with a comprehensive application-specific template library, method setup supported by tooltips, and a drag-and-drop user interface to facilitate method development
- Consistent instrument control software whether using Thermo Scientific™ Xcalibur™ Software or Chromeleon CDS for data acquisition

Included software

Xcalibur software

- Xcalibur software is the control software for the next-generation Thermo Scientific™ mass spectrometer portfolio
- Accelerates familiarization and reduces training needs

Thermo Scientific™ Orbitrap™ GC-MS Contaminants Library

- Allows fast start-up for environmental and food safety screening and quantitation applications
- Contains over 1,200 spectra of food and environmental contaminants, including pesticides, PAHs, PCBs, dioxins, and furans
- User guide included detailing how to install and make custom enhancements to library

Optional software

Chromeleon CDS

- Streamlined chromatographic and MS screening and quantitative workflows within an enterprise and compliance-ready single software application
- Features dioxin eWorkflow including acquisition, processing, and application-specific reporting templates

Thermo Scientific™ Compound Discoverer™ Software

Streamlines small molecule unknown identification, determination of real differences between samples, and elucidation of biological pathways with an integrated suite of data analysis tools.

Thermo Scientific™ Orbitrap™ GC-MS HRAM Flavor and Fragrances Library

- High-resolution, accurate-mass spectral library acquired at 60,000 mass resolving power (FWHM *m/z* 200)
- Spectra for 411 flavor compounds across 11 categories, refined and curated with elemental composition of each EI fragment verified
- Compound information list showing chemical categories, odors, rendition index values, and GC column types used

Thermo Scientific™ TraceFinder™ Software

Acquire and process your high-throughput screening and quantitation with built-in intelligence, driving productivity gains from data acquisition and processing to reporting.

Operation modes

Resolution settings

Ranging from 7,500 to 60,000 at *m/z* 200

Scan functions

The following scan modes are standard with the Orbitrap Exploris GC S mass spectrometer:

Full scan

High sensitivity, high selectivity full scan for targeted and untargeted analyses

tSIM

- Targeted SIM with Mass List Table
- Isolation width, resolution, and microscans set values are definable compound-dependent (without MSX (multiplexing))
- Isolation width: 0.4 u to 50 u
- Multiplexing for up to 20
- MSX ID, multiplexing groups definable
- Isolation width set values are definable compound-dependent (with MSX)

General

- Multiple experiments can be set up within one method
- One experiment can contain combinations of scans

System templates

System templates provide predefined parameters in each template for users to fast load in the Method Editor for data acquisition. To achieve optimum results when applying a template, the user is guided with more detailed information in help files.

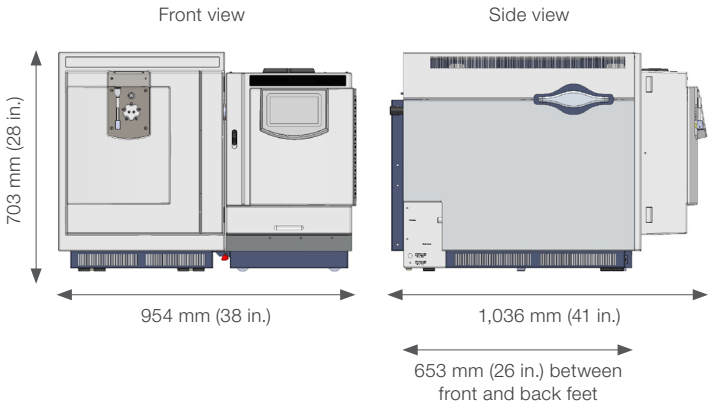
System templates categories:

- Food safety
- Environmental

Installation requirements

Power

- 2 × 208–240 Vac single phase, 15 A, 50/60 Hz, with earth ground for instrument and source vacuum pump
- 208–240 Vac single phase, 15 A, 50/60 Hz, with earth ground for the data system



Gas

Helium

- High-purity helium gas supply (99.999% pure)
- Regulator output pressure adjustable from 300 to 1,000 kPa (3 to 10 bar, 45 to 145 psi)

Nitrogen

- High-purity nitrogen gas supply (99.999% ultra-high purity)
- Regulator output pressure at 800 ± 30 kPa (8.0 ± 0.3 bar, 166 ± 4 psi)

Environment

- System averages 3,440 W (11,730 Btu/h) output when considering air conditioning needs
- Operating environment must be 18–27 ˚C (64–81 ˚F). Relative humidity must be 20–80% with no condensation
- Designed for indoor use at an altitude of up to 3,000 m (10,000 ft) above sea level

Dimensions (w, d, h)

- 954 × 1,036 × 703 mm (38 × 41 × 28 in)

Weight

- 156 kg (344 lb) including GC and one injector, without data system and optional items

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