Thermo Scientific
TRACE GC Ultra
Multi-channel gas chromatograph

The Thermo Scientific TRACE GC Ultra is a multi-channel gas chromatograph, developed for the GC market’s evolving requirements. Besides offering the most complete range of proprietary inlets, sensitive detection systems, smart accessories, and ancillary devices, the Ultra platform also features unique technologies that raise the standard of Speed, Sensitivity and Separation in gas chromatography.

Unique Techniques

Ultra Fast
20 times faster analyses
The Thermo Scientific UltraFast GC column module featuring heat-up rates up to 1200 °C/min can dramatically shorten analysis cycles without compromising analytical resolution, precision, or reliability. Column modules are available for virtually any stationary phase.

Large Volume Splitless
50 times more sensitive
Large Volume injection capability up to 50 µL, available on a standard TRACE GC Ultra™ SSL injector, greatly extends sensitivity of conventional GC methods in a simple and effective fashion. 250 µL capability offered through the On-column and PTV options completes the offering by meeting all requirements for trace analysis.

Comprehensive Two Dimensional Gas Chromatography (GCxGC)
30 times higher peak capacity
Comprehensive Two Dimensional Gas Chromatographic approach (GCxGC) extends the separation capability of your TRACE GC Ultra. Thanks to the proprietary Dual Jet CO2 Cryogenic Modulator (*) fully integrated in the GC you can experience the most advanced separation technology for most complex sample characterization.

(*) Sold under license from Zoex Corp. for thermal modulation

Ultra in Flexibility
In addition to a comprehensive range of injectors, the availability of a universal base body allows swift detector interchangeability and configurations with up to three detectors operating simultaneously, thus providing added value on your investment.

Ultra in Solutions
Combined with the Valve Oven, the TRACE GC Ultra delivers unmatched turn-key solutions even for the most demanding applications requiring multidimensional column switching techniques. Multiple packed or capillary columns, sampling and switching systems, and pressure regulators can all be effectively installed in an additional heated and readily accessible housing.

Ultra in Reliability
The new re-designed digital pneumatic modules assure highest accuracy and precision in carrier gas control. Besides, the proprietary Algorithm for Column Characterization grants utmost stability in both retention time repeatability and reproducibility.

Ultra in Automation
A vast array of automatic sampling systems (for liquid, headspace and SPME*) makes this GC able to withstand even the highest workload requirements, operating unattended around-the-clock. Instrument control and acquisition, enabled by Thermo Scientific proprietary or third party data systems, are further exploited by the internal LAN interfacing capability.

(*) Sold under license from Supelco®
Features and Technical Specifications

**Column Oven**
Programmability: 7 Ramps/8 Plateaus. Temperature range: few degrees above ambient to 450 °C. Maximum Temperature ramp: 120 °C/min. Typical heat-up from 50 °C to 450 °C in 420 seconds. Typical cool down: 450 °C to 50 °C in 250 seconds. Sub-ambient: -99 °C with liquid N₂, -55 °C with CO₂ options.

**Injectors**
Vaporizing Inlets
SSL, Packed, Purged Packed
B.E.S.T. PTV


Non-Vaporizing Inlets
Cold On-column
Septumless injector. No heating of the injector is required. Suitable for manual and automated operations. Cryogenic coolant not required.

**Large Volume Options**
Large Volume Cold On-column


Large Volume B.E.S.T. PTV
Up to 450 µL injection volume. Heated Solvent Split valve. Compatible with optional Backflush kit for PTV. Suitable for large volatility range samples in dirty matrices.

Large Volume Splitless
Patented technology. Up to 50 µL injection volume. Suitable for manual or automated injections. Suitable for samples amenable to split-splitless injector.

**Inlet Pneumatics**
Digital (250 and 1,000 kPa)


**Detectors**

- **Flame Ionization Detector**
  MDA: $2 \times 10^{-12}$ gC/sec
  Linearity: Better than $10^5$
  Selectivity or additional features: Flameout detection and timed programming capability. Acquisition rate 300 Hz

- **Thermal Conductivity Detector**
  600 pg Ethylene/mL He
  Linearity: Better than $10^9$

- **Electron Capture Detector**
  < 10 fg of Lindane
  Linearity: Better than $10^9$

- **Nitrogen Phosphorus Detector**
  5 x $10^{-12}$ gN/s and 2 x $10^{-11}$ gP/s
  Linearity: Better than $10^9$

- **Flame Photometric Detector**
  1 x $10^{-12}$ gC/sec and 10⁻³ (P), 10⁻³ (S) after linearization
  Linearity: P/C = 10⁶:1; S/C = 10⁵:1

- **Photo Ionization Detector**
  1 x $10^{-12}$ g of Benzene
  Linearity: Better than $10^9$
  Selectivity or additional features: Patented lamp cooling system for temperatures up to 400 °C

- **Pulsed Discharge Detector**
  Low pg range
  Linearity: $10^9$
  Selectivity or additional features: Non radioactive source

**Valve Oven**
Independently heated valve housing able to accommodate up to 4 heated/2 unheated gas valves, 8 pressure regulators, 8 needle valves, In/out ports, packed and capillary columns. Maximum Temperature isothermal 175 °C.

**Ultra Fast GC**

- **Liquid and Headspace Sampling**
  AI 3000 II
  Compatible with SSL, B.E.S.T. PTV, PKD and PPKD Injectors. Maximum injectable volume 5 µL. Minimum 20 nanoliters with 0.5 µL syringe, “plunger-in-nozzle”. Up to 8 sample vial capacity. Upgradable to AS 3000 II.

- **AS 3000**
  Same as AI 3000 II but with up to 105 sample vial capacity.

- **TriPlus AS II**
  Compatible with all injectors. 2x150 positions sample trays. Offers automated Large Volume injection capability up to 450 µL, solvent flush and internal standard injection modes. Available in “clone mode”, with one sampling unit automating 2 adjacent GC or GC-MS. Upgradable to TriPlus Duo.

- **Headspace Sampling**
  TriPlus™ HS
  2 X 54-position trays. Heated syringe (Maximum Temperature: 150 °C). 6 position Incubation Oven with shaker and heating. Multiple Headspace Extraction (MHE) device available. Upgradable to TriPlus Duo.

- **Liquid and Headspace Sampling**
  TriPlus Duо
  Same as TriPlus AS and HS, offering both liquid and Headspace sampling capability through 2 dedicated “snap-on” interchangeable turrets.

- **Automated Sample Preparation**
  TriPlus SPME
  2 X 54-position sample trays. Variable fiber penetration depth, suitable for both liquid and Headspace extraction. Optional 2-ports, inert gas purged, fiber conditioning station.

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