

Finnigan TRACE GC Ultra



Productivity
Beyond Limits

a leader in chromatography

Thermo
ELECTRON CORPORATION

Introducing the "Ultra" concept

Timely responding to the need of modern laboratories for higher productivity and increased sensitivity, Thermo introduces the new Finnigan TRACE GC Ultra generation.

The "Ultra" platform combines the reliability of the TRACE GC with further extended overall system usability, performance, and automation. On top of this, go faster than any speed limit and beyond any sensitivity boundary with the highly innovative content of the new UltraFast and Large Volume splitless techniques.

"Beyond" conventional Gas Chromatography

Ultra in Speed

Imagine the ability to squeeze your analyses down to 1-2 minutes. Imagine the ability to reduce your analytical cycle by up to a factor of 35. Now stop imagining – it's true! No more speed limits with the new Direct Column Heating Technology. Just equip your standard SSL inlet and FID detector with the UltraFast column module and... experience the adrenaline of speed. On a standard instrument.

Ultra in System Usability

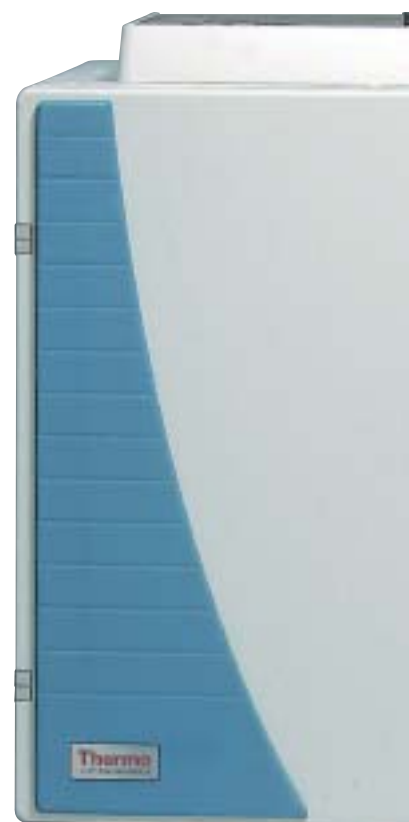
The ability to easily provide the most appropriate solution in a highly reliable manner can make the difference between "just another" GC and the "right" GC.

In addition to featuring a complete list of highly technological injectors, Finnigan TRACE GC Ultra can provide any solution in the simplest and most straightforward way. Powerful synergy with specific accessories can drastically transform the system, add value and improve performance. Unequalled stability results from the combination of a highly reproducible, fast oven capability (120°C/min) and state of the art pneumatics.

Injectors: Accuracy and precision granted by more than forty years of recognized innovations in inlet technology!

Accessories: Small devices or full-size options make TRACE GC Ultra your evolving platform.

Pneumatics: Its unique characteristics add flexibility and ease of use to your daily work!



Ultra in Sensitivity

You can inject up to 250 µl with Large Volume on-column injection, and up to 250 µl with Solvent Split PTV (programmable temperature vaporizer). And now, for the very first time, you can also increase the sensitivity of the market's most popular injector by more than 50 times, at no additional cost, learning curve or method revalidation. Take advantage of Large Volume Splitless, Thermo's patented, breakthrough injection technique. A wide array of highly sensitive detectors complete the offering. And you can change them in minutes or configure them for simultaneous detection, to get the most out of your analyses.



Ultra in System Automation

Finnigan TRACE GC Ultra offers both low or high throughput capacity: whichever the technique, is just a matter of choice, in line with your budget requirements.

With Atlas™ or Chrom-Card data systems, direct control and acquisition, local area networking (LAN) interfacing or remote control and diagnostics are moved beyond lab walls. A further improvement in efficiency and sample flow productivity.

Learn how TRACE GC Ultra sets new standards in sample automation.

Ultra in Quality Assurance

A complete validation package addresses even the most stringent prerequisite stipulated by highly regulated environments. Both hardware and software performance can be routinely certified.

*The best start
for good
chromatography*

Wide or narrow volatility range, clean or dirty matrices, stable or labile compounds: TRACE GC Ultra offers the most appropriate inlet design for each sample.

The complete selection of inlets, for the right choice

Extended Performance Split-Splitless Injector

Optimised for both split and splitless modes of operation to address diluted and concentrated samples respectively, this is a unique injector in its class.

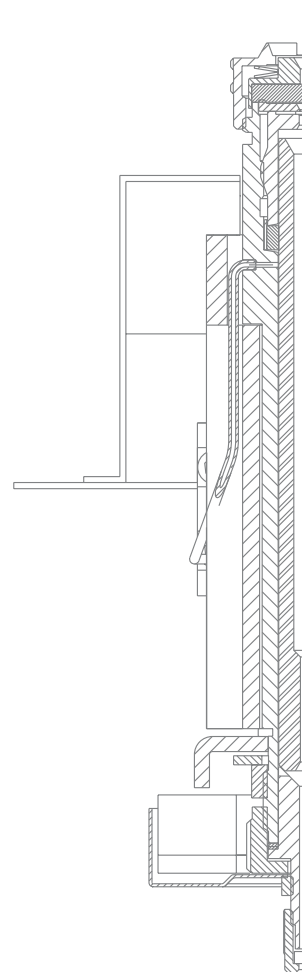
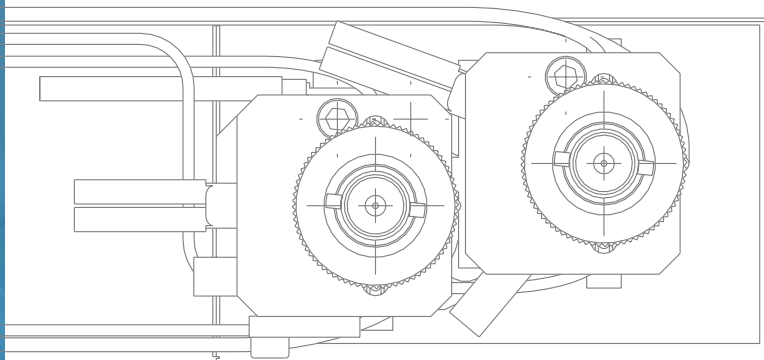
The optimised thermal profile and the unique design demonstrates wide sample linearity permitting Large Volume Injection with up to 50 μl , besides virtually eliminating discrimination. Contamination and septum bleed effects are prevented by an efficient double sweeping chamber. Additionally, wide bore and packed columns can be easily connected for increased flexibility and added cost savings.

This injector is the ideal solution for samples having limited range of volatility in both dirty or clean matrices.

On top of that, this is the only system capable of Large Volume Splitless injections!

Packed and Purged Packed

Dedicated vaporizing injectors allow TRACE GC Ultra to offer an affordable solution also when using packed (glass and metal) or wide bore capillary columns.



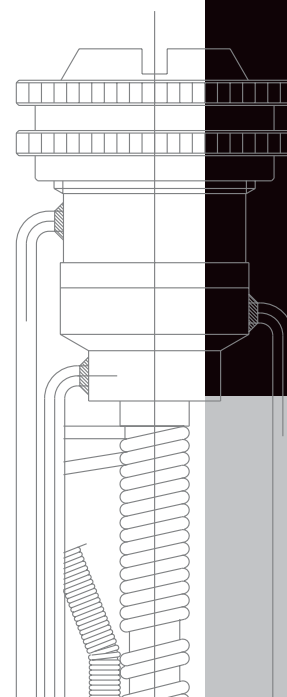
BEST PTV™ (Brightly Enhanced Sample Transfer PTV Injector)

By combining inert liners and a long vaporizing chamber with reduced internal diameter, the BEST PTV is able to completely preserve sample integrity in virtually all situations. Moreover, its low thermal mass permits it to achieve one of the

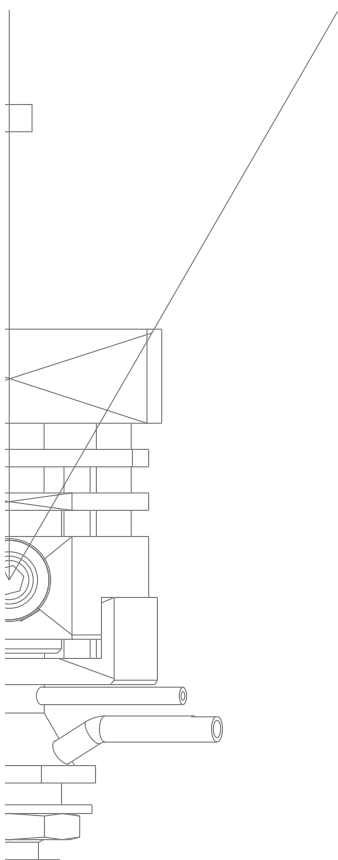
fastest heating rates (up to 15°C/s) on the market, thus ensuring complete sample transfer to the analytical column also for high-boiling compounds. Its programmability with up to 5 different operation modes covers all the various vaporizing injection techniques. Smart design of the cooling system permits rapid cool down with just ambient air forced by a

built-in fan. The cryogenic options (LN₂ and LCO₂) available are used only when initial sub-ambient temperatures are required.

This proprietary injector is the perfect solution for the analysis of undilutable and dirty samples as well as medium-boiling-point compounds: the ideal complement to the cold on-column injection.



Productivity Beyond Limits



True Cold On-Column Injector

TRACE GC Ultra offers the only true Cold On-column injector, the reference standard by which all other sampling systems are measured. Through this inlet, samples are injected directly into the capillary column, avoiding high temperature vaporisation processes that may adversely affect quantitative results. A permanent air cooling of the injector body prevents in-needle vaporisation, and a programmable secondary air-cooling system temporarily isolates the needle tip and the injection zone from the oven. This results in total elimination of discrimination and thermal degradation, even allowing injection of very volatile solvents, and prevention of sample back ejection and band broadening effects.

Sample volume up to 250 µl in a single shot can be easily introduced using the Large Volume on-column option. This reduces sample preparation and delivers increased sensitivity at lower cost per analysis.



Ultra in System Usability

Sample separation through speed, reproducibility, and efficiency

Research caliber results through high precision digital gas controls

Low and high pressure (250 and 1000 kPa) pneumatic modules provide the optimal solution for all analytical needs. While the former is ideal for high precision and accuracy in carrier gas control with standard capillary columns, the latter ensures utmost performance in ultra fast GC applications. Furthermore, the standard gas saver function provides the ability to reduce the split flow during the analytical cycle, eliminating the waste of carrier gas.

In addition, Finnigan TRACE GC Ultra offers proprietary Automatic Column Characterisation (ACC), and Leak Check functions right at your finger tips.

A wide range of solutions minimizes up-front investment and lowers cost of ownership:

- A high precision and ultrastable column oven capable of rapid heat-up and cool-down rates allows conventional fast GC with narrow bore capillary columns.
- State of the art digital pneumatics grant utmost retention time reproducibility.
- A series of smart accessories ensures high separation efficiency.



Automated Leak Check

This built-in diagnostic tool is the ideal way to routinely check your GC system, safely reducing the time required for both instrument control and injector maintenance.

Exclusive, One-touch, Instrument Repeatability

ACC is the ability to deliver unrivalled "column-to-column" and "instrument-to-instrument" retention time repeatability! This unique feature permits you to automatically measure and store the real column parameters, making retention time independent of column sizes. This allows GC-to-GC or GC/MS method transfer to be accomplished in a rapid and straightforward manner.

Accessories further expanding the efficiency of your GC platform

Backflush Kit for PTV Inlet

Designed to expand overall PTV injector performance, even in the Large Volume mode, this accessory offers the capability to shortly reverse the direction of the flow inside the injector. When operating in "reverse flow mode", heavy or "undesired" compounds can be vented from the split line, while still maintaining a carrier gas

flow through the analytical column.

Just another extremely powerful tool to:

1. Dramatically reduce analysis time
2. Enhance PTV LVI performance
3. Provide impressive ease of injector's maintenance even with MS
4. Prevent column degradation
5. Improve chromatographic resolution

HOT (High Oven Temperature) Device for OC Inlet

This unique device permits cold on-column injections to be performed even at high initial oven temperatures. By precisely controlling the temperature at injection point, medium and high boiling compounds can be analysed isothermally or by short temperature programs, dramatically shortening overall cycle times.

Cold Trap

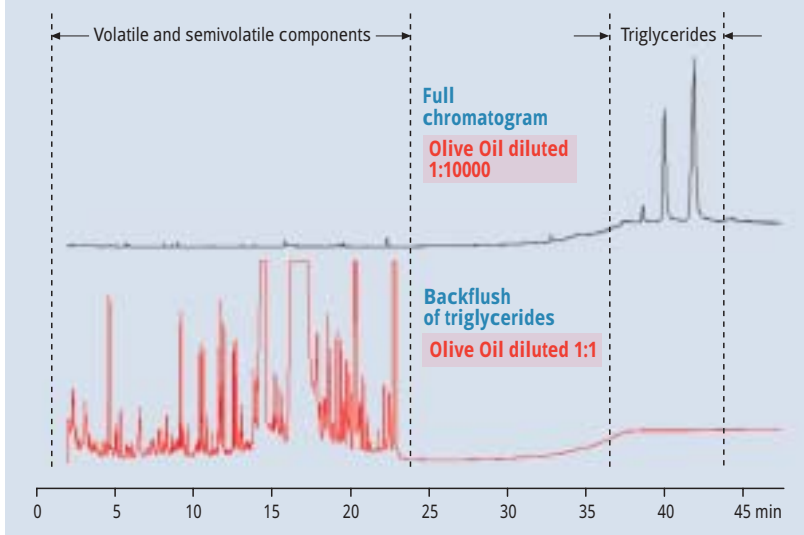
Installed inside the GC oven is capable of sub-ambient cooling (-160°C) and ballistic heating of a short piece of fused silica column, preserving peak shape and improving sensitivity. This accessory is therefore the ideal complement for Purge & Trap, Headspace or Thermal Desorption techniques for trace analysis with narrow bore capillary columns: a simple solution for critical applications!

Valve Oven for Petrochemical Turn-key Analyzers

A MUST solution for multidimensional chromatography. This heated enclosure enables installation of additional separation columns, gas and liquid sampling devices, switching valves as well as auxiliary pneumatic modules, and restrictors for engineered solutions in an elegant and effective manner.

Other...

- Merlin microseal septumless device
- Volatiles in Packages (ViP 2000)
- TD & P&T interface kit
- Oven cryo
- H₂ sensor
- Methanizer for FID



Ultra in Speed

*Speed and Accuracy:
the winning duo*

Finnigan TRACE GC Ultra incorporates revolutionary GC technology for unprecedented UltraFast analyses with no trade-off in repeatability and reliability of results. Just the best solution for accurate, rapid quantitative characterisation of your sample.

Real cost reduction through increased productivity



The Finnigan TRACE GC ULTRA is the first gas chromatograph offering direct column heating technology integrated in a flexible GC platform, to heavily boost your lab's productivity. This innovative technology allows combination of a "turbo heating" linear temperature ramp of up to 1200°C/min with short, narrow bore (0.1 mm i.d.) columns. Dramatically reducing the analytical run time, this solution permits you to achieve extremely high sample/day throughput. Additionally reducing to a few seconds the final isothermal time and greatly extending the column lifetime (more than 10000 cycles).

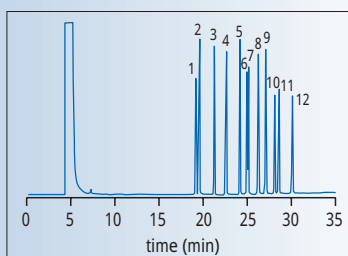
The sample transfer mechanism which takes place during the injection additionally allows the introduction of the sample at low split ratios, thus substantially increasing the sensitivity of the system. Besides the tremendous speed achieved, the system is able to deliver analysis of compounds even at trace levels.

Combined with either a high-speed Flame Ionisation Detector (Fast FID) or with Thermo's fastest mass spectrometer, the powerful Finnigan TEMPUS® Time-of-flight, TRACE GC Ultra is able to deliver express results with a high degree of accuracy.

UltraFast GC - Separation of VOCs in 35 seconds

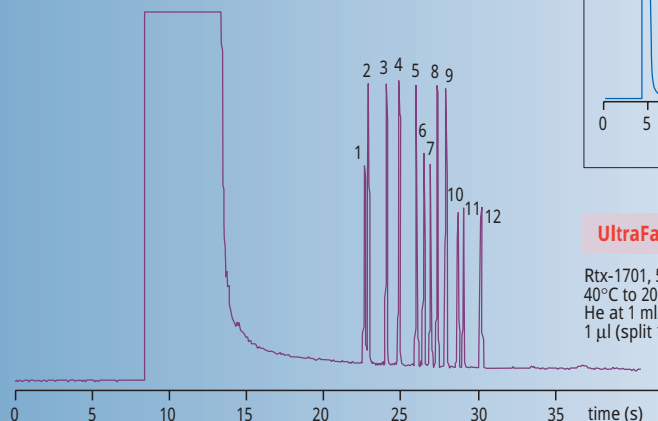
1 chlorobenzene	7 4-chlorotoluene
2 p-xylene	8 tert-butylbenzene
3 o-xylene	9 sec-butylbenzene
4 isopropylbenzene	10 1,3-dichlorobenzene
5 n-propylbenzene	11 1,4-dichlorobenzene
6 2-chlorotoluene	12 1,2-dichlorobenzene

Conventional: 35 min.



UltraFast: 35 seconds

Rtx-1701, 5 m x 0.1 mm i.d., 0.1 µm f.t.
40°C to 200°C at 5°C/s
He at 1 ml/min
1 µl (split 100:1)



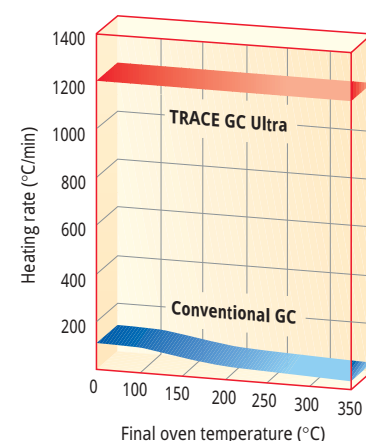
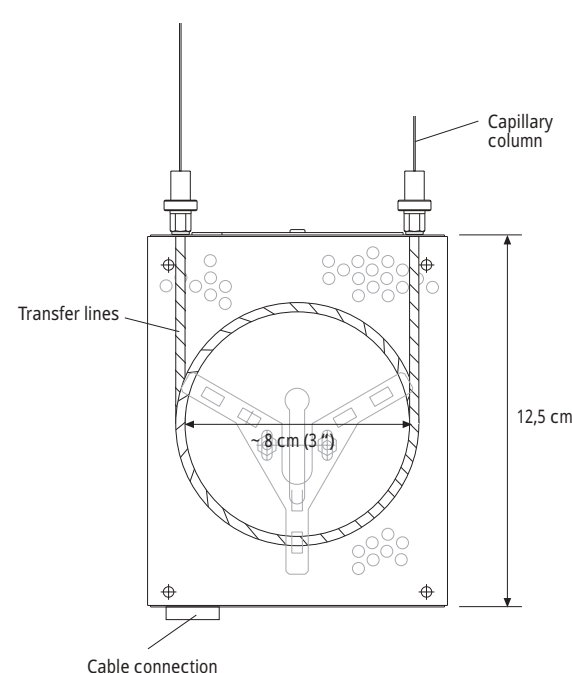
The Power of Simplicity

The UltraFast module can easily be programmed and controlled either through local GC keyboard or data system. When required, the column can rapidly be changed by simply replacing the full module. Installation is performed just as for any conventional column, and no further specific set-up or optimisation is necessary. For your analysis, you simply select the most appropriate stationary phase and temperature program. The rest is the same as using your standard gas chromatograph, with the exception of having results delivered at a remarkable speed!

Analyses Faster than Any Other Fast GC Method

The core of the UltraFast module is a directly heated, usually narrow bore capillary column able to achieve very fast temperature programming rates (up to 1200°C/min), linear throughout the whole range. Furthermore, even at the highest temperature, the limited thermal

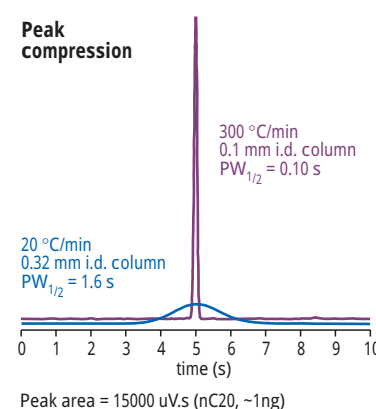
mass of the system permits the initial set-point to be achieved with virtually zero cooling time. Results are therefore delivered at a speed far exceeding the sample throughput offered by even the fastest conventionally heated GC oven. Finally, a large variety of column phases permits application of this innovative technology in chemical, petrochemical, environmental, and flavours and fragrances.



Higher Sensitivity: Lower Split Ratios and Narrower Peaks

One limiting factor of conventional fast chromatography with narrow bore capillary columns is usually the reduced sensitivity delivered by the system. This is the result of the high split ratios required to maintain a reasonably narrow sample band width at the beginning of the column, mandatory to preserve the overall column's efficiency. Finnigan TRACE GC Ultra, by virtue of the unique split/splitless injector design combined with quick column temperature programming, completely eliminates this limitation, ensuring a correct sample transfer at low split ratios. Results show incredible performance, even for splitless injection obtained by

properly combining pressure surge with cold trapping effect in the column. On top, 10 times narrower peaks widths (around 100 ms) produced by the tremendous heating power are translated in a 10 times higher signal, without the same proportional increase in noise level. Sensitivity with ultra-fast analysis is no longer an issue!



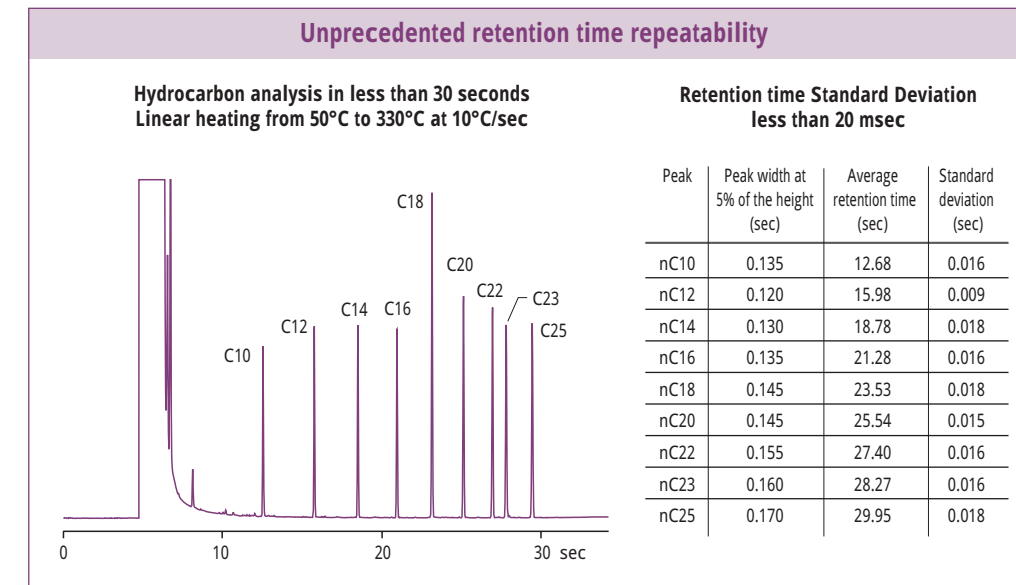
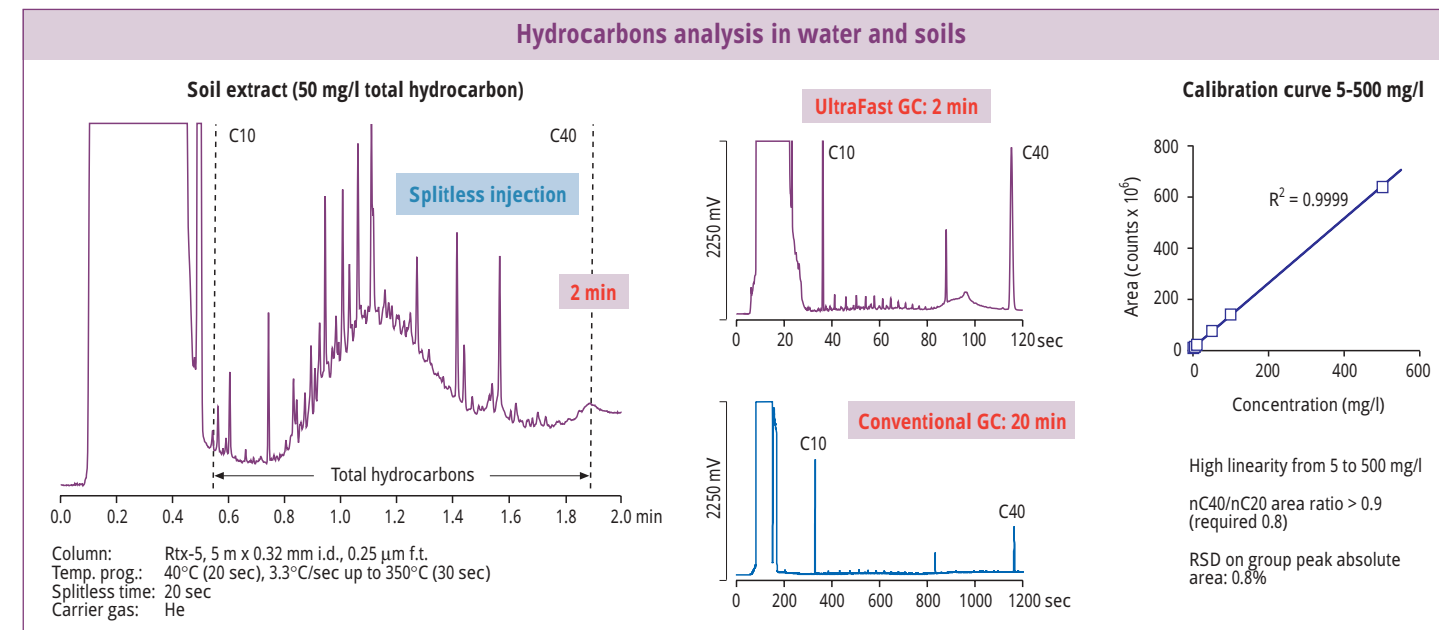
No Compromise on Data Acquisition

For such narrow peaks, data acquisition must be accordingly high. For immediate quantitation, a high-speed Flame Ionisation detector (FID) permits rapid data collection with frequencies as high as 300 Hz, without compromising the peak shape.

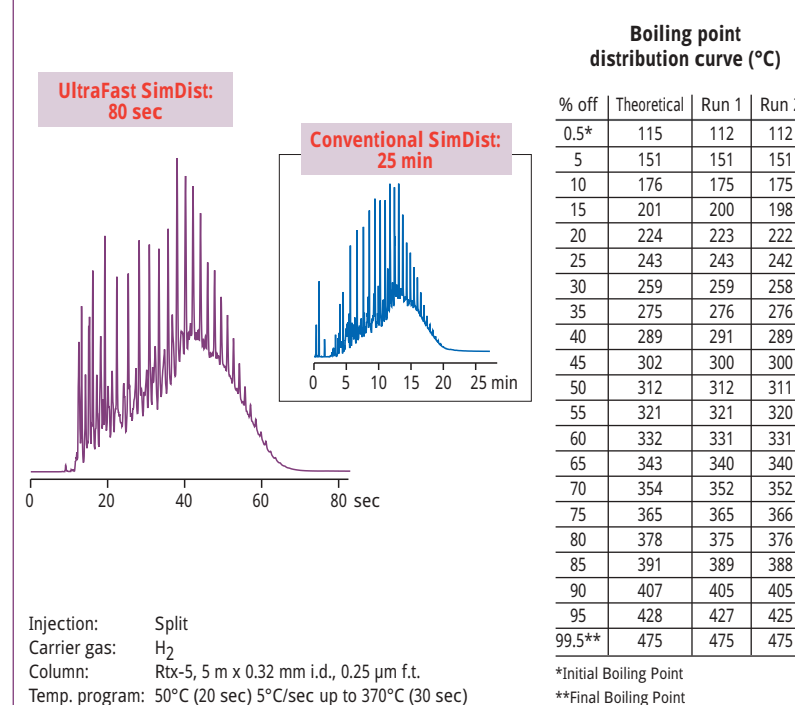
When positive identification is required, the bench-top Finnigan TEMPUS Time-of-flight, is the ideal complement to this technology, offering simultaneous compound quantitation and characterisation, in an extremely highly productive manner.

Reliable, Automated Peak Identification

Highly repeatable retention time with a relative standard deviation of one tenth of the peak width is the ultimate run-to-run repeatability delivered by the Finnigan TRACE GC Ultra, as shown in the examples. This data precision enables safe peak identification to be performed automatically from the relevant component table. This is a fundamental requirement to easily handle the large amount of information generated by the system.

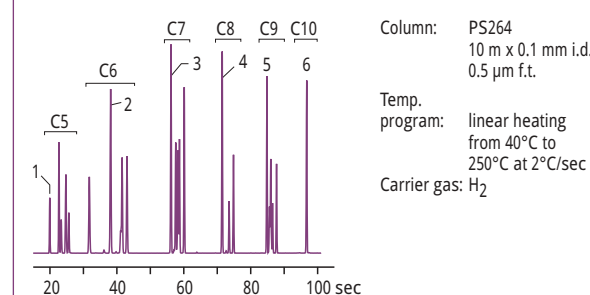


Accurate and precise Simulated Distillation by ASTM 2887



Analysis of C5-C10 olefins in less than 100 seconds

Analysis time using conventional PIANO capillary column is almost 80 minutes



Great retention time and peak area accuracy

Peak	Average ret. time (sec)	RSD%	Average peak area (counts)	RSD%
1 3-methyl-1-butene	19.04	0.25	317513	1.40
2 1-hexene	36.04	0.12	1396152	1.39
3 1-heptene	54.92	0.07	1684804	1.66
4 1-octene	70.61	0.06	1889209	1.88
5 1-nonene	84.44	0.05	1852738	2.13
6 1-decene	96.70	0.05	1994282	2.74

Data based on 10 injections

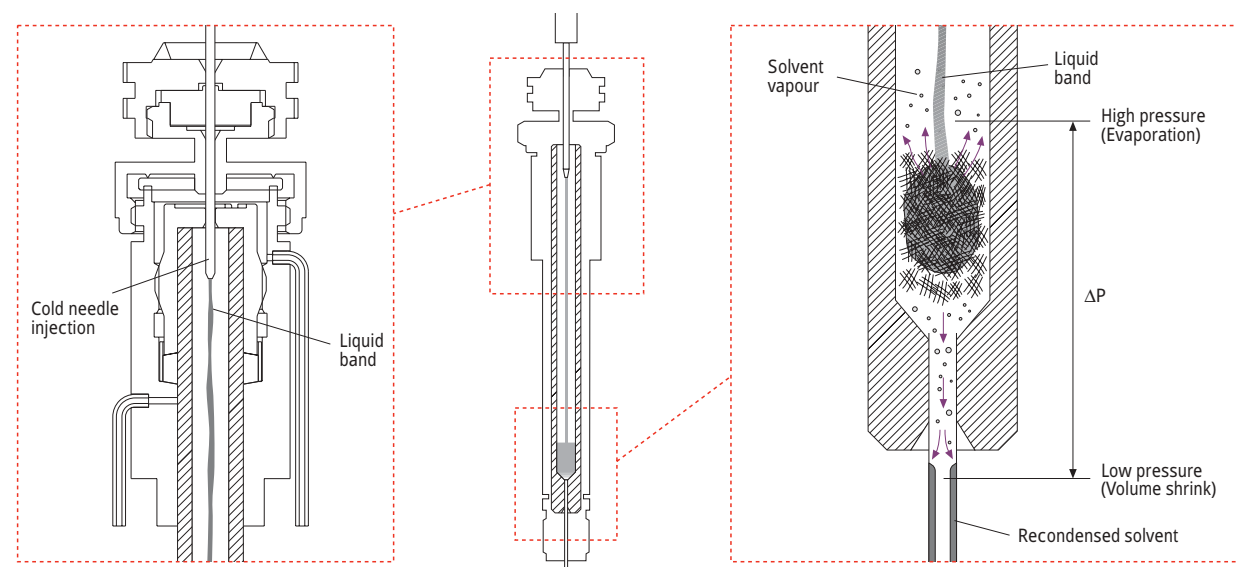
Simple and Powerful Accelerated Vapours Transfer by CSR

The innovative, simple and effective Concurrent Solvent Recondensation (CSR) technique allows you to perform splitless injection of volumes up to 50 µl. By means of the "Liquid Band Formation" injection approach, the sample is deposited as a single liquid "droplet" at the bottom of the injector. Then, the generation of a sudden, temporary strong

pressure increase resulting from incipient solvent evaporation pushes the first vapours from the inlet to an uncoated pre-column. In this area, kept few degrees below the solvent's boiling point, the recondensation occurring causes a "volume shrink" which generates a strongly accelerated transfer of the whole sample to the pre-column. Through this self regulated process the solvent vapours recondense at the same speed and time (*Concurrently*) as the

vapour formation inside the liner, therefore making the size of the split/splitless injector chamber no longer a limiting factor to the injected volume.

The hardware of the Finnigan TRACE GC Ultra is purposely designed to accomplish this proprietary, innovative injection technique in a fully automatic fashion. Volumes up to 50 µl can be introduced without any added complexity, since all the processes involved are self regulated.



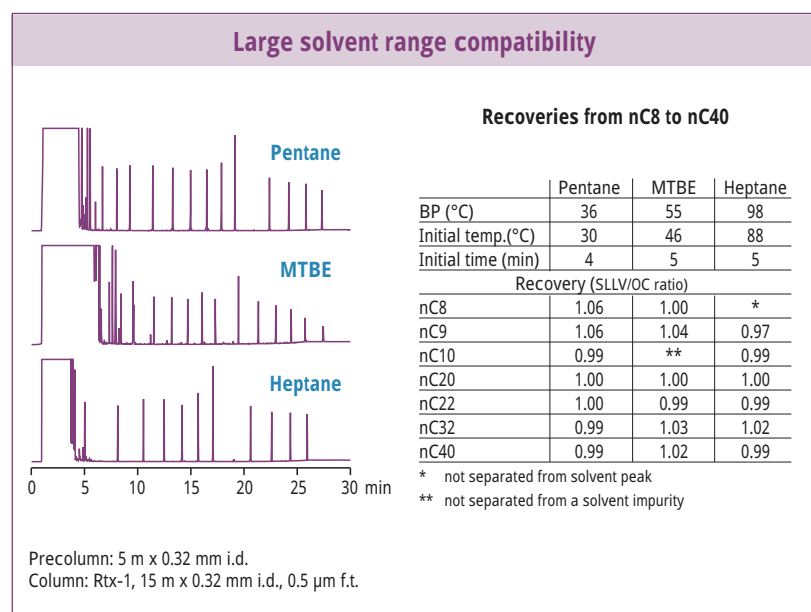
Trace Analysis without Method Revalidation

The capability of the standard split/splitless injector to increase sensitivity by a factor of 50 with no additional trials or hassles, discloses the domain of Large Volume also to the world's most popular injector. When trace analyses of samples amenable to this inlet cannot be successfully accomplished by a standard 1-2 µl injection, large volume splitless is able to avoid the transition to large volume On-Column or PTV techniques. No additional waste of time for method revalidation is hence required. Additionally, rapid learning is ensured through the dedicated software assistant. Parameters such as initial oven temperature and initial hold time are automatically calculated depending on the solvent and volume selected.

Preserved Sample Integrity

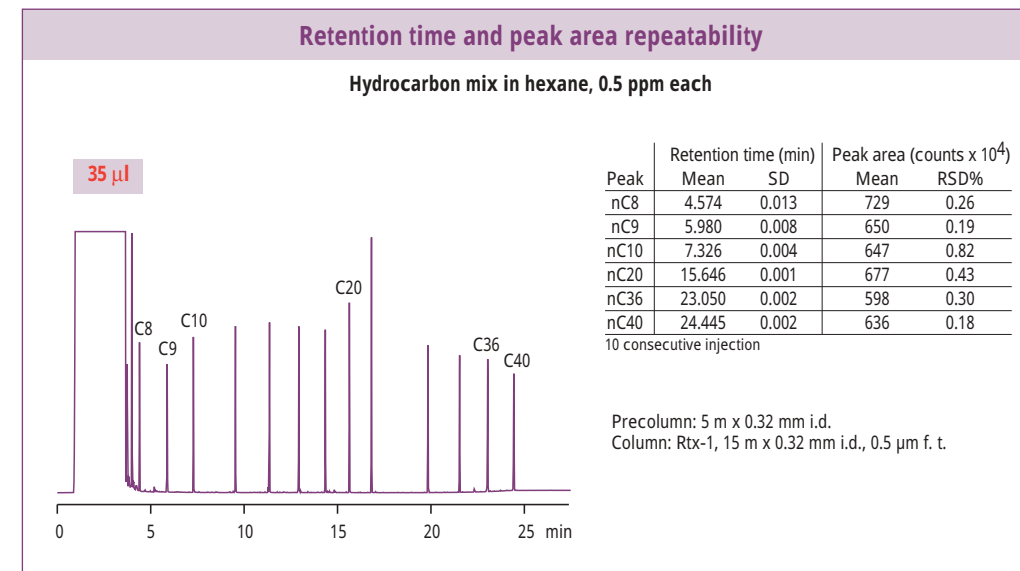
Large Volume Splitless analyses of samples with different solvents are compared, normalised to C20, to those generated by using

cold on-column inlet, showing total recovery even for n-C40. No sample discrimination is observed, neither for the volatile nor for the high boiling fractions.

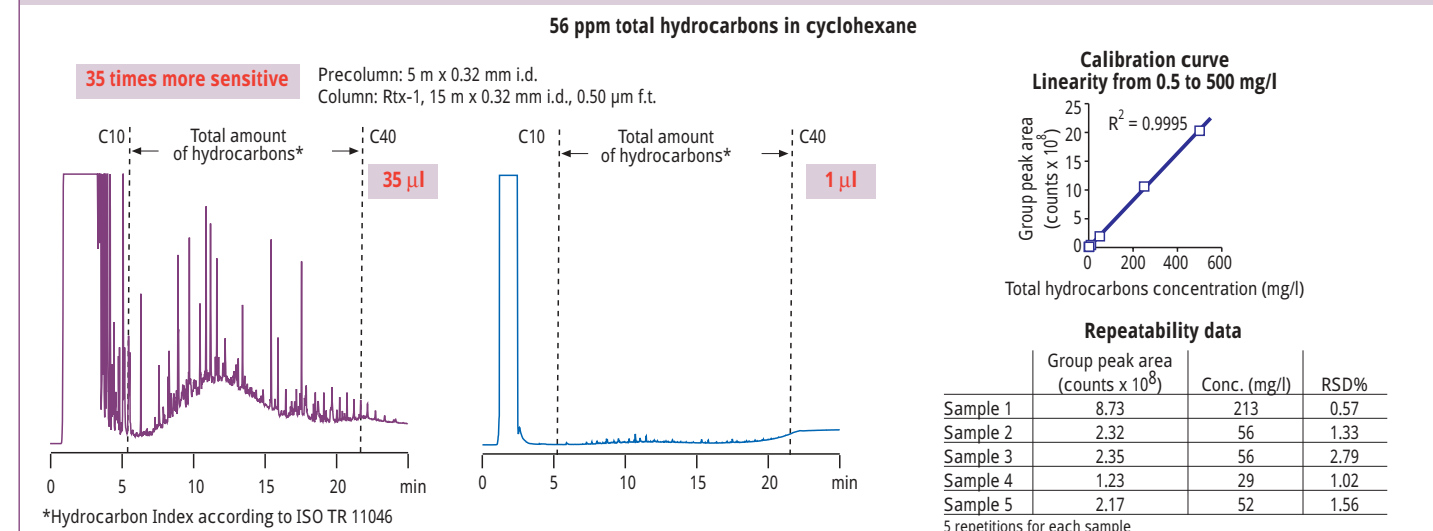


Repeatability and Linearity

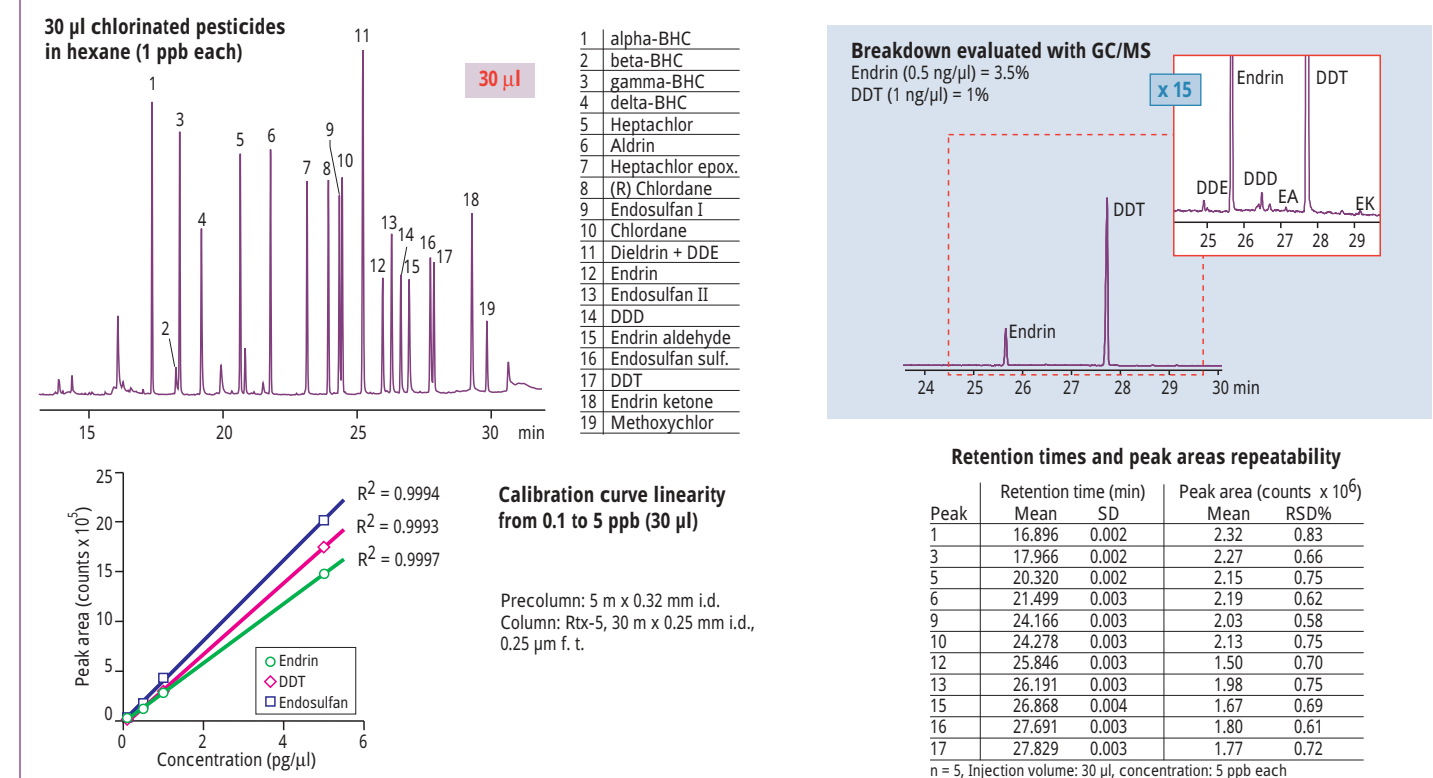
Utmost precision in retention time and peak area for automated peak identification and quantitation is granted by a correct execution of CSR through the TRACE GC Ultra's superior capability. In addition linearity from 1 to 50 µl complies with the stringent requirements of a large number of certified methodologies, making this technique the ideal solution for a vast number of applications (i.e. environmental, forensic, food and flavours, petrochemical ect...).



Hydrocarbons analysis with GC-FID (ISO TR 11046)



Analysis of chlorinated pesticides with GC-ECD



Thermo: Once more the first!

On top of the well known large volume on-column and large volume solvent split (PTV) injection modes, Thermo introduces, for the first time in the market, the Large Volume Splitless technique. This major innovation extends the benefits of Large Volume Injection to virtually any sample, ranging from volatile to heavy components, from clean to dirty matrices.

Large Volume Splitless

This technological breakthrough made available for the first time on a commercial GC, significantly increases the sample volume injection capability in the Thermo split-splitless injector up to 50 μL . The unique inlet and pneumatic design of the TRACE GC Ultra makes this technique simple and natural, requiring just a limited injector set-up – namely the use of a pre-column and a packed liner. In addition, the ability to reliably operate even with manual injection, allows you to quickly implement this operating mode, with minimum effort, in all labs already using splitless injection method. Sensitivity increased by 50 times and higher productivity are the immediate benefits. The robustness versus contaminants, which are trapped in the packed liner, and the complete absence of discrimination versus both volatile and relatively high boiling components, are further advantages. Finally, as most of the injection parameters remain unchanged, Large Volume splitless injection can be adopted without requiring any method revalidation.

Large Volume On-Column

Finnigan TRACE GC Ultra also offers the possibility to inject up to 250 μL in a single shot, using the traditional on-column Large Volume solution. By means of a precolumn retention gap and a solvent vapor exit valve, the sample is introduced directly into the capillary column maintaining sample integrity and avoiding loss of resolution. After pre-concentration in the retention gap, the excess of solvent is vented, thus preserving the detector, without losing the volatile fraction. Reliable quantitation is hence possible even at sub ppt detection limits. Suitable for clean samples, the total absence of discrimination makes Large Volume on-column particularly beneficial in a wide range of environmental and quality control analyses ranging, for instance, from purgeable halocarbons up to polynuclear aromatic hydrocarbons.

Large Volume Solvent Split (PTV)

Large Volume injection into a PTV inlet permits you to introduce the sample into a cold liner, while the solvent is evaporated and vented through the split line. This is closed at the end of solvent evaporation and the liquid sample is transferred to the column, by rapid heating of the injection chamber. Volume as large as 250 μL can be automatically injected into the PTV inlet, making trace analyses of polluted samples carried out with no additional costs, at the highest level of accuracy. This technique is not suggested for volatile samples as they can be partially vented together with the solvent.

Ultra in Sensitivity

*Inject more to
detect ultra traces!*

The quest for methodologies capable of combining high quality results with the cost reduction requirements of the modern lab, makes Large Volume Injection techniques an unavoidable choice. Responding to this specific necessity, on the Finnigan TRACE GC Ultra, Thermo provides the most complete range of solutions, now also adding the revolutionary Large Volume Splitless capability.

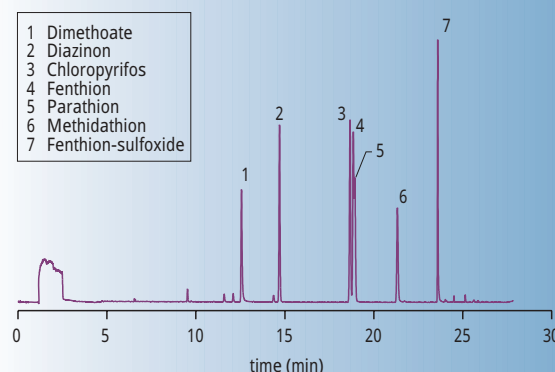
Large Volume Splitless

Trace Analysis of OPPs with GC-FPD

40 μL , 12 ppb each

Precolumn: 5 m x 0.32 mm i.d.
Column: Rtx-1, 15 m x 0.32 mm i.d., 0.5 μm f.t.

- 1 Dimethoate
- 2 Diazinon
- 3 Chlorpyrifos
- 4 Fenthion
- 5 Parathion
- 6 Methidathion
- 7 Fenthion-sulfoxide



Ultra in Sensitivity

*A prompt response
to your sample's
concentration*

In line with your lab's evolution, Finnigan TRACE GC Ultra combines utmost sensitivity with added versatility, highly increasing the information/analysis ratio.

Available detectors

- Thermal conductivity detector (TCD)
- Flame Ionisation Detector (FID)
- Electron capture detector (ECD)
- Nitrogen phosphorus detector (NPD)
- Flame photometric detector (FPD)
- Photoionisation detector (PID)
- Pulsed Discharge Helium ionisation detector (PDD)
- Entire Thermo MS range

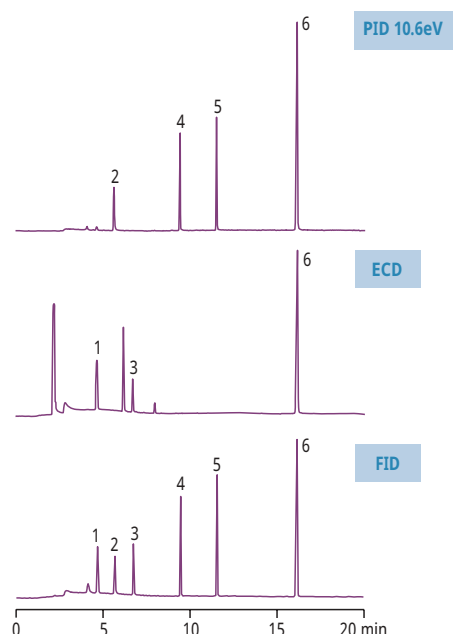
Immediate and easy
detector inter-changeability
is the Ultra value

Multiple Response in a Single GC Run

The possibility to simultaneously combine different detection characteristics can largely extend the amount of data delivered in a single GC run. In-series, staked or parallel configurations of detectors featuring different selectivity and sensitivity allow you to obtain two or even three different chromatograms (up to three detectors may be operated simultaneously) from the same analysis.



Headspace analysis of organic volatiles in water



Sample:	waste water
Incubation:	30 min at 70°C with shaker
Injection volume:	2 ml
Carrier gas:	He 2ml/min
Oven temp.:	50°C (1 min) at 10°C/min up to 150°C (5min)
Detectors:	PID, FID, ECD in series
Column:	PS255, 30 m x 0.32 mm i.d., 2 µm f.t.
Split ratio:	1/10

1	Dichloromethane
2	Methyl ethyl ketone
3	Dichloroethane
4	Toluene
5	m-Xylene
6	o-Dichlorobenzene

Flame Photometric Detector (FPD)

The unique combustion chamber provides a signal-to-noise ratio for phosphorous compounds ten times greater than traditional FPD detectors. A second photomultiplier can be implemented easily for simultaneous determination of phosphorous and sulfur (or tin) compounds.



Pulsed Discharge Helium Ionisation Detector (PDD)

Featuring a non radioactive source, it is the right replacement for the traditional Helium ionisation detector, not being subjected to radioactive material regulations. PDD is the ideal universal detector for attaining sensitivity in the low ppb range. Its electronics has been proprietarily optimised to enable "zero parameter set-up" (only on/off button) for extreme ease of use.



Electron Capture Detector (ECD)

With the micro cell volume design, detection limits in the parts per trillion range and linear dynamic range of four orders of magnitude can routinely be achieved. Important savings in time and service costs are the benefits of its unique structural concept: the collector electrode geometry allows easy access for cleaning without reaching the source, making this operation possible by any technician. Safety wipe tests are required only every three years, further decreasing maintenance costs.



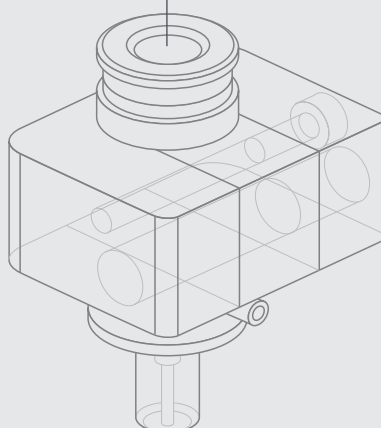
Photoionisation Detector (PID)

The unique capability to operate at temperatures up to 400°C extends detection also to high boiling compounds. The patented lamp-cooling design and the highly inert sample pathway increase lamp lifetime for low cost of ownership and permits analysis of thermally labile compounds.



Universal Base Body Approach

The presence of a base body common to all GC ionisation detectors makes switching from one detector to another possible using common, every-day tools by lab personnel (no service call is necessary). You can be ready to run samples in only a few minutes, just like having more GCs in place of one. Urgent analysis completed – problem solved.



Ultra in System Automation

*Unattended
around-the-clock
operation*

A wide range of modular, automated sample preparation injection systems help reduce cost per analysis and increase productivity levels.

Full spectrum of sampling systems for all needs

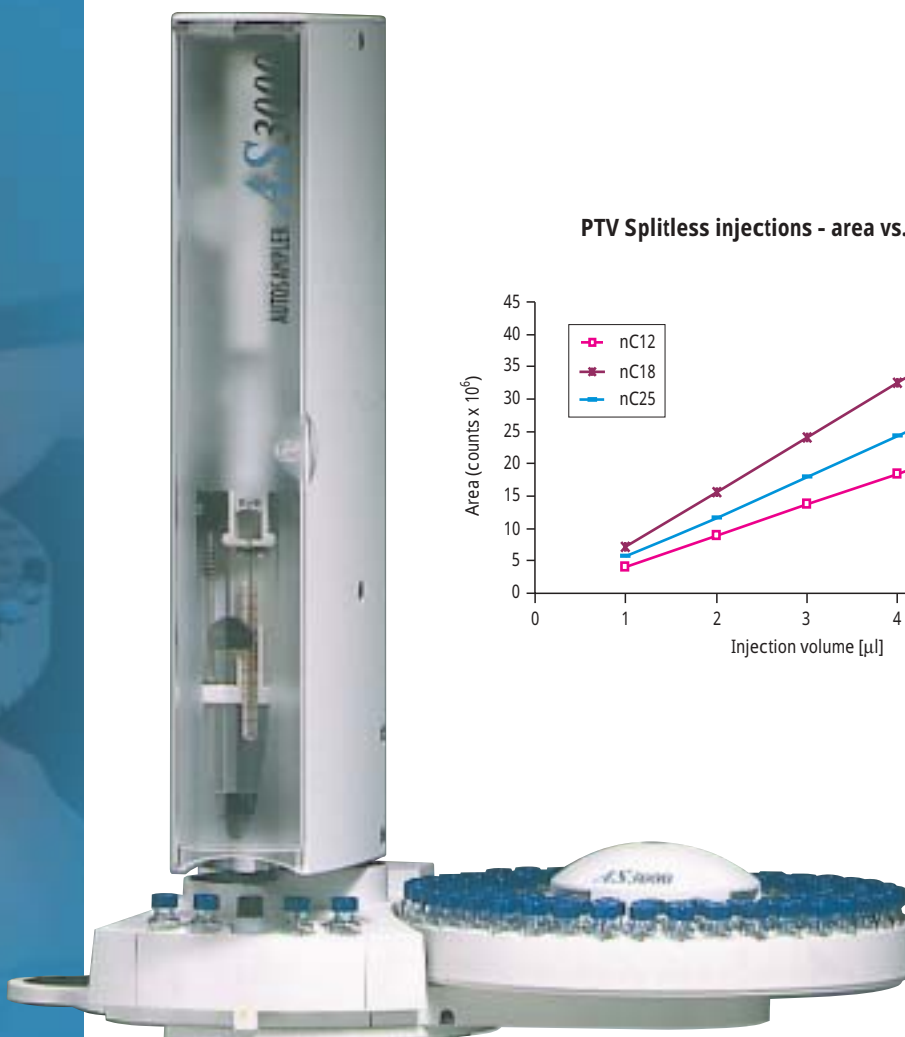
Series 3000 Liquid Sampling Systems

Establishing the Performance/Simplicity=1 paradigm hence making simplicity now directly proportional to top performance, the 3000 Series is the ideal solution for conventional routine analysis in vaporizing injectors.

Engineered to meet the highest level of ruggedness and ease of use, this product can perfectly fulfill the requirements of both QA/QC or high throughput environments.

The AI 3000 Autoinjector is an 8-position sampling module. It combines the high precision of an automatic injection system with the ease of use of the Plug & Play concept, and represents the ideal answer to those labs requiring highly reliable results even for small batches of samples.

A special upgrade option allows you to turn the AI 3000 into the high throughput AS 3000 Autosampler with the addition of a 105 sample tray, making the initial investment a worthwhile choice.



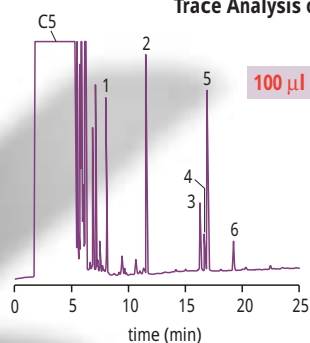
Series 2000 Liquid Sampling System

Compatible also with the On-Column inlet the AS 2000 liquid autosampler is the solution for "advanced" injection techniques. By

offering the highest flexibility in parameter selection, permits injection procedures such as Large Sample Volume, solvent flush or internal standard addition to be accomplished in the most efficient way and with the maximum degree of accuracy.

Large Volume On-Column Injection

Trace Analysis of BTEX in water - In-vial extraction



Column: 50 m x 0.25 mm i.d.,
Megasolve, 0.4 µm f.t.
Precolumn: UNICORET
Oven: 40°C (3min) to 80°C (2min) at 2°C/min
Carrier: He
Detector: FID

In-vial extraction of 30-150 ppb spiked tap water

Peak	relative peak area*	
	1 µl	100 µl
1 Benzene	0.56	0.57
2 Toluene	0.88	0.87
3 Ethylbenzene	0.40	0.38
4 m-Xylene	0.20	0.20
5 p-Xylene	1.00	1.00
6 o-Xylene	0.15	0.17

* Relative area calculated considering p-Xylene as internal standard



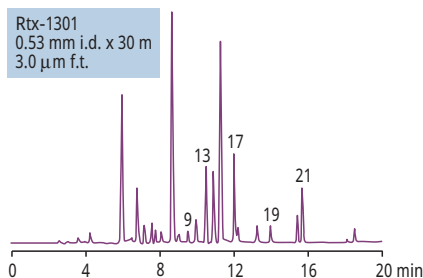
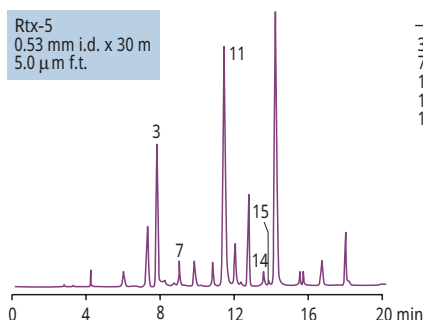
HS 2000 Headspace

With no use of transfer lines for gas sampling, this system is able to combine superior accuracy and rapidity, with unrivalled simplicity of operation. The heated proprietary gastight syringe is able to ensure complete sample transfer

avoiding any condensation, while the 6-position heated incubation oven with shaker significantly speeds-up the sample preparation step. The possibility to accurately and easily select different volumes permits exact quantification of the analytes through easy and fast system calibration.

Single Injection confirmation analysis

Organic impurities in pharmaceutical products



	Peak area		
	Average (ppm)	Std dev.	RSD %
9 Cyclohexane	9.50	0.09	0.91
13 Chloroform	9.91	0.09	0.93
17 Benzene	9.94	0.13	1.30
19 1,4-Dioxane	9.75	0.30	3.08
21 Toluene	9.55	0.29	3.03

	Peak area		
	Average (ppm)	Std dev.	RSD %
3 Diethyl ether	8.99	0.13	1.49
7 Methylene chloride	9.96	0.14	1.44
11 Ethyl acetate	9.88	0.13	1.30
14 Tetrahydrofuran	9.66	0.09	0.98
15 1,2-Dichloroethane	9.93	0.13	1.33

Column flow: DPFC at 12 ml/min
for each column
Column temp.: 40°C to 180°C at 10°C/min
Injection volume: 1.0 ml
Split: 30:1
Syringe temp.: 110°C
Incubation temp.: 100°C
Incubation time: 20 min



Ultra in System Automation

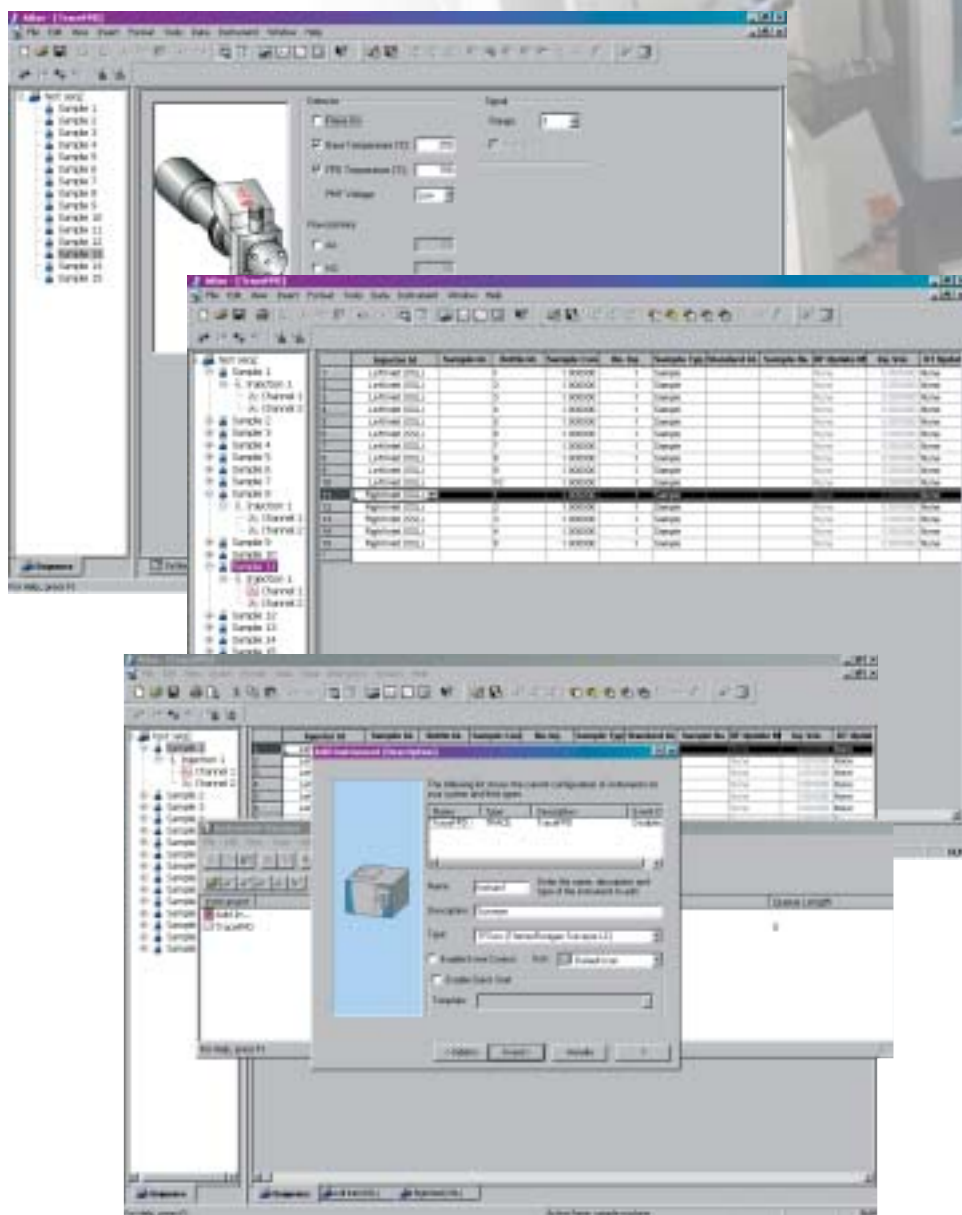
Instrument control, data acquisition and handling that fits the way you work!

Atlas 2003

Atlas™ 2003 is the new Chromatography Data System (CDS) of the Thermo family. Designed to fit the workflow of chromatography laboratories, Atlas is a full-featured CDS system capable of acquiring, processing, and managing chromatographic data from a virtually unlimited number of instruments (from 1 up to 1000+). Chromatographers from major companies participated in every stage of its development using a Joint Application Development program. This software, besides providing full control of the Finnigan

TRACE GC Ultra, offers full data processing for all GC, LC and GPC analytical techniques. Controls for third party instruments are available as well, making this an ideal universal platform. Editing sequences functions like in a Microsoft® Excel spreadsheet, and using Microsoft® Outlook-style bar to view all data, provides immediate familiarity with this system, considerably reducing learning times. Finally, Atlas can be configured to ensure that its data and electronic records are secure and compliant with all regulatory requirements, including 21 CFR Part 11.

Local Area Networking (LAN) interfacing for remote control and wide Data System connectivity are TRACE GC Ultra's power of automation.

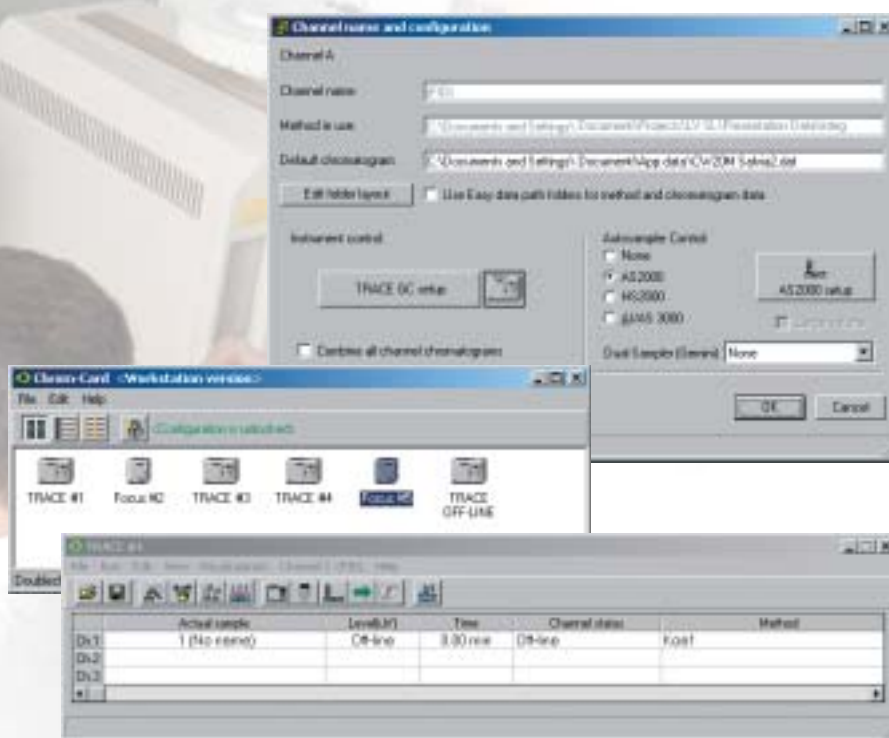


Chrom-Card 32-Bit

This 32-bit software benefits from the extensive gas chromatography knowledge typically available in the analytical laboratory, and is a cost-effective software solution for rapid instrument control and data acquisition and handling. Shaped around the Finnigan

TRACE GC Ultra and the concept of simplicity, is the right choice for GC specific laboratories. Redundancies that unnecessarily complicate data handling systems are eliminated, bringing the user up to a high productive level in a very short time. Operating under the major software platforms (Windows 98, NT, 2000 and X P), the

software allows compliance with all the requirements of the most modern laboratories in terms of data security, reporting and networking. Password protection and profile-selective accessibility, GLP, 21 CFR Part 11, internal validation procedures are the new standards: Chrom-Card for TRACE GC Ultra is the solution.



Complete System Validation

The available validation package allows you to sign, date, and execute instrument's compliance to the required standards in a timely manner throughout the life of your TRACE GC Ultra. A further assurance for organizations having regulatory agencies auditing their analytical instruments, offering the right solution for highly regulated environments:

Installation Qualification (IQ): guarantees correct instrument acceptance and proper installation

Operational Qualification (OQ): ensures that instrument will function according to its operational specification in the selected environment.

Performance Qualification (PQ): proves the instrument's consistent performance over time, according to a specification appropriate for its routine use.



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