



CompactGC^{4.0}

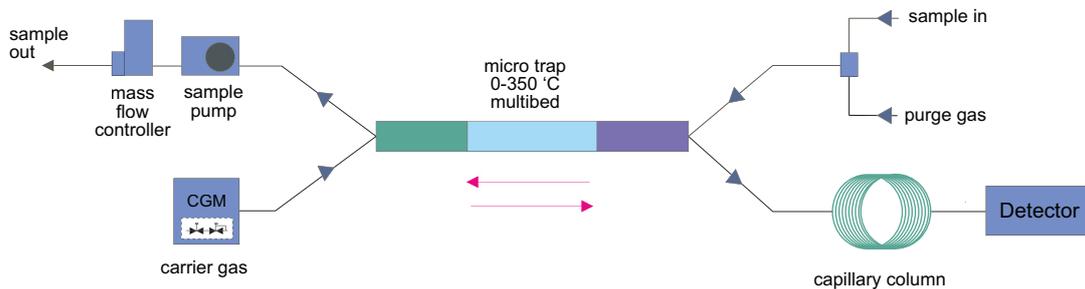
Thermal Desorption Concentrator

Temperature programmed analysis

- **ppb / ppt sensitivity**
- **fast analysis**
- **small footprint**
- **electrically cooled trap**

GAS offers custom configured GC analysers for many application fields since 35 years. GAS analysers are designed to meet many standardised methods from GPA, ASTM, UOP, ISO, EN and others. The efficient configurations are based on proven GC technology, resulting in robust instruments with an optimal return on investment.

Volatile components are present in nearly every atmosphere. Many of them are toxic, and have strict limit levels. Others may cause inconvenience due to low odour threshold levels. Thermal desorption (TD) is the technique of choice for air monitoring (indoor, outdoor, workplace, automobile interior, breath, etc.) It is an invaluable tool when sample enhancement is needed to reach the very low detection levels required.



PRINCIPLE

The core of CompactGC^{4.0}-TD is a Peltier cooled trap with an adsorbent to pre-concentrate the components of interest. A precise volume is sent to the adsorption trap by using a pump and mass flow controller. Volumes typical range from 25 ml to 1 litre. After the sampling stage, the trap is purged for air and water removal using an inert gas. This ensures good chromatography and avoids degradation of the adsorbent. Next

the trap is rapidly (100 °C/s) heated, releasing the pre-concentrated components, which are swept to the analytical column by the carrier gas.

MULTI-BED TRAPS

Typical trap/desorb temperatures are 0 to 350 °C. A fast heating rate is important in obtaining the small injection band necessary for fast GC analysis, which is a typical property of CompactGC^{4.0}. During desorption, the trap flow is reversed in relation to the

sampling flow. This allows the use of multi-bed traps: two or three separated adsorbents with increasing trapping power for collection of components with a wide boiling point range.

ELECTRICALLY COOLED

Thanks to the electrical cooling, the instrument runs unattended without the use of cooling agents like CO₂ or liquid N₂.



COMPACT INSTRUMENT

All the parts described such as collection trap and mass flow controller are located inside the standard 19" enclosure, resulting in a very compact design. CompactGC^{4.0} relies on proven GC technology, using standard available columns and diaphragm valves, resulting in a highly reliable instrument with low operational costs. FID, TCD, PDD, PFPD and Mass Spectrometer are the available detectors.

AVAILABLE APPLICATIONS

Thermal Desorption covers several application fields like environmental, material emission, defense, forensic and food. Typical applications are BTEX, TO-14, fermentation headspace analysis, low sulphur and others.

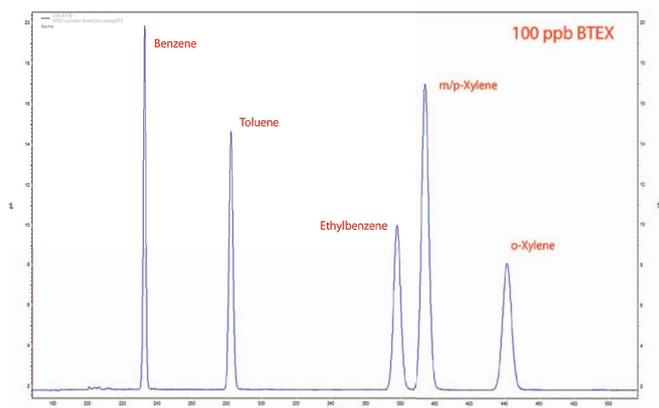
MANY TRAPS AVAILABLE EASY EXCHANGEABLE

The General Purpose trap covers many components, while various specific adsorbent (multi) bed traps are available for specific applications. Water and solvents are selectively purged, thus reducing analytical interference. The traps are easily exchangeable by the user.



PROGRAMMABLE COLUMN

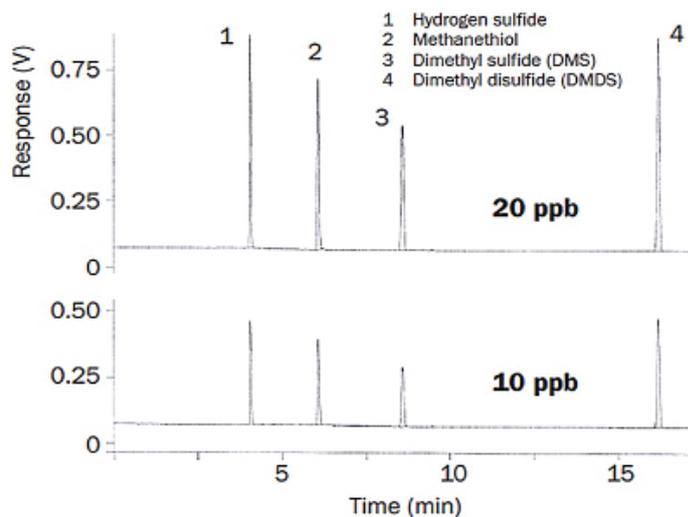
For analysing components with a wide range of boiling points, a temperature programmed analysis is applied. A low mass nickel-wire-wrapped column allows rapid heating up to 500 °C/min, with short runtime as a result.



APPLICATION EXAMPLE: BTEX-TD-FID

The chromatogram above shows an application example of BTEX monitoring in air, 100 ppb concentration level, with FID detection. Conditions:

Trap: U-T2GHP-2S (general purpose hydrophobic)
Trap temperature: 30 to 300 °C
Sample: 60 ml at 30 ml/min
Trap Hold: 1 min
GC Column: Rtx-VMS, 1.8u, 10m * 0.32 mm ID; 50 °C
Carrier gas: He, 100 kPa, splitflow 10 ml/min
Detector: FID; 110 °C
Standard: 100 ppb BTEX in N₂
LODs (3 * s/n): 0.3 ppb Toluene



APPLICATION EXAMPLE: LOW SULPHUR-TD-PFPD

The above chromatogram shows the analysis of low level sulphur components in ambient air. Conditions:

Trap: Graphitised carbon black/silica gel
Trap temperature: -5 to 250 °C
Sampling volume: 100 mL at 50 ml/min
Nafion dryer: In-line
Trap Hold: 5 min
Flow path temp.: 80 °C (critical)
GC Column: Rtx-1, 30 m × 0.32 mm × 5.0 µm, 60 °C
Carrier gas: He, 2.0 mL/min
Detector: PFPD (square root function on), 200 °C (S filter)
LOD: 0.5 ppb for above shown sulphur components

SPECIFICATION

Configuration:	CompactGC ^{4.0} with electrically cooled trap for thermal desorption applications
Detectors:	FID, TCD, PDD, PFPD, MS
Optional:	Trap desorb on 2 or 3 analysis channels for enhanced separation / detection Additional channels with Gas Sampling Valve
Sample tubing:	Sulfinert® tubing for inert sample path
Application:	Various applications in environmental, material emission, defense/forensic and food
Range / LOD:	ppt - ppm, depending on sample volume and component-sorbent interaction
Repeatability	< 5 % RSD with internal sample pump < 0.5 % RSD with pressurised sample
Sample requirements:	See our pre-installation guide for additional requirements
Trap low temperature:	0 to 50 °C (-10 to 50 when ambient temperature is ≤20 °C)
Desorbion temperature:	50 to 350 °C
Trap heating rate:	100 °C/s
Prog. column oven:	40-350 °C; heating rate up to 500 °C/min
Flow path:	Inert by using Sulfinert tubing and glass trap
Flow path temperature:	40 to 140 °C
Water management:	ambient and elevated temperature purging of the cold trap

Available traps:

U-T2GPH-2S:	General-purpose hydrophobic (C ₄ /C ₅ -C ₃₀ /C ₃₂)
U-T11GPC-2S:	General-purpose carbon (C ₄ /C ₅ -C ₃₀ /C ₃₂)
U-T12ME-2S:	Materials emissions
U-T15ATA-2S:	TO-15/TO-17 air toxics
U-T16GHG-2S:	Greenhouse gases
U-T17O3P-2S:	Ozone precursors
U-T6SUL-2S:	Sulphur/labile
U-T10CW-2S:	Chemical warfare agents
U-T1HBL-2S:	High-boilers
U-T7EMP-2S:	Empty glass

The GAS CompactGC^{4.0} concept:

19" gas analyser
Robust diaphragm valves
4 parallel analytical channels
TCD, FID, PFPD, PDD, MS
Cycle time 10 sec – 2 minutes
Exchangeable columns
TD Pre-Concentrator option
Many applications available



GAS is an
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