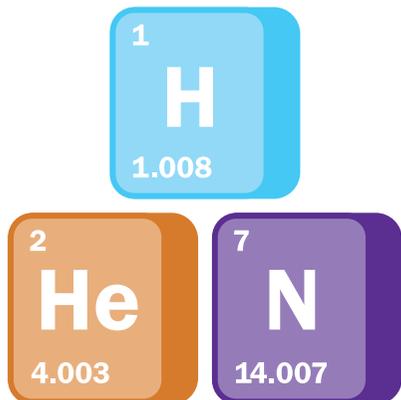


# Multi-Gas -xr series

Hydrogen-certified thermal desorption  
for GC-MS



# Multi-Gas enabled thermal desorption (TD): The latest innovation from Markes International

## A major step forward in TD-GC-MS productivity

In a world first for TD instrumentation, Markes' Multi-Gas enabled UNITY-xr™, ULTRA-xr™, TD100-xr™ and ULTRA-xr Pro™ have all been independently certified for safe operation with hydrogen carrier gas as well as helium and nitrogen.

Choosing one of our new hydrogen-certified TD instruments protects your laboratory against future helium shortages and reduces running costs. Operating with hydrogen also increases sample throughput by as much as 50% while maintaining analytical performance. TD-GC-MS methods can be easily converted, and existing columns and consumables can be used, thus allowing fast adoption in busy laboratories.

**Multi-Gas enabled technology from the world's leading TD provider – Fast return on investment without any compromise in data quality.**



**UNITY-xr™** – optimum two-stage TD performance for single sorbent tubes.



**TD100-xr™** – the world's leading automated thermal desorber with capacity for 100 tubes.



**UNITY-ULTRA-xr™** – thermal desorber for 100 sorbent tubes that can be upgraded to on-line and canister analysis.

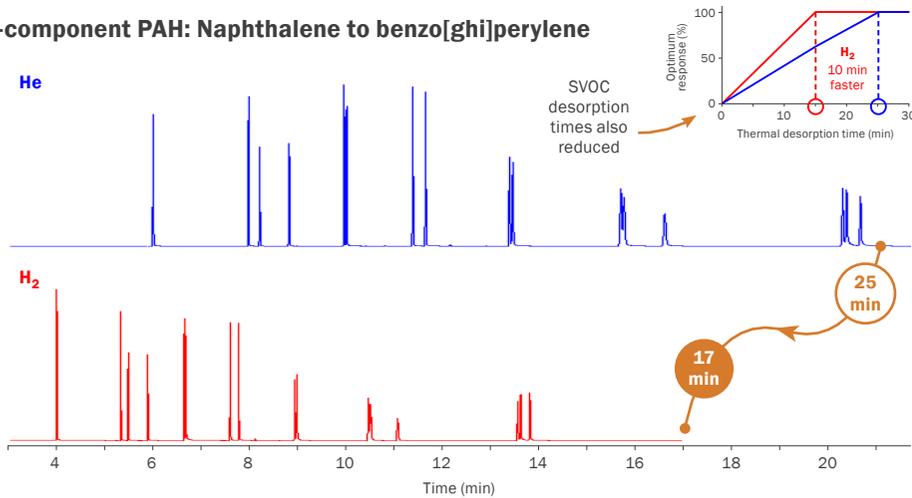


**ULTRA-xr Pro™** – 199-tube TD autosampler with exceptional re-collection versatility

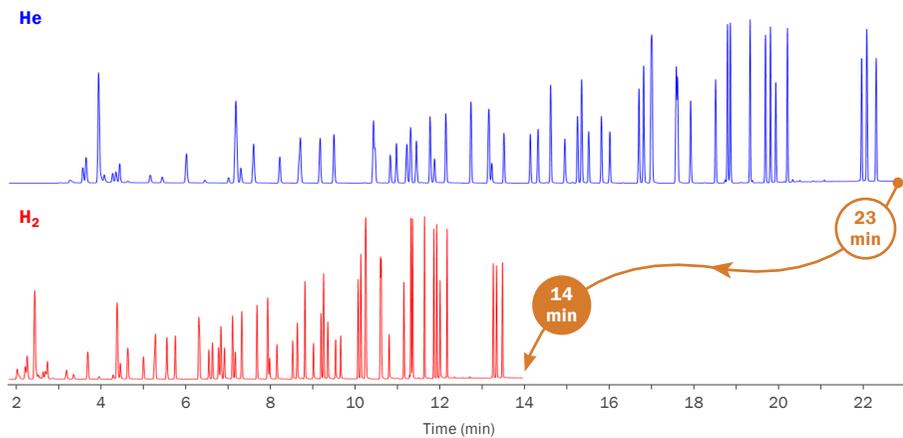
# Exceptional productivity enhancement guarantees fast return on investment

Markes' thermal desorbers already lead the way in sample throughput with robust operation, high capacity and powerful overlap mode allowing subsequent samples to desorb while the previous GC run is still ongoing. **Hydrogen carrier gas offers further significant improvement while maintaining exceptional method performance...**

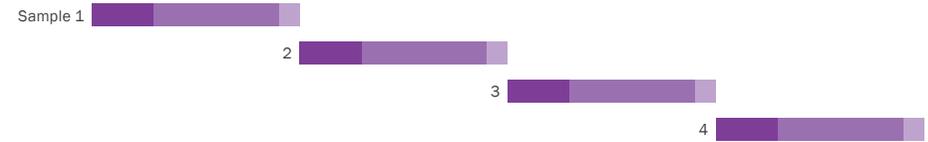
## 16-component PAH: Naphthalene to benzo[ghi]perylene



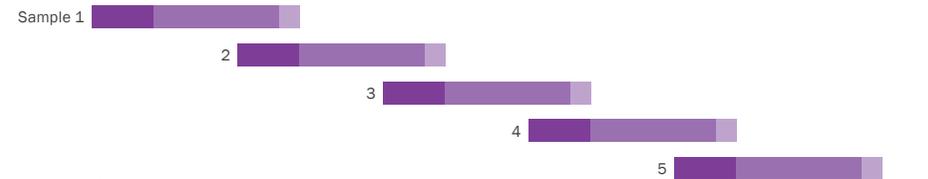
## Standard of 65 'air toxic' VOCs (US EPA Method TO-17)



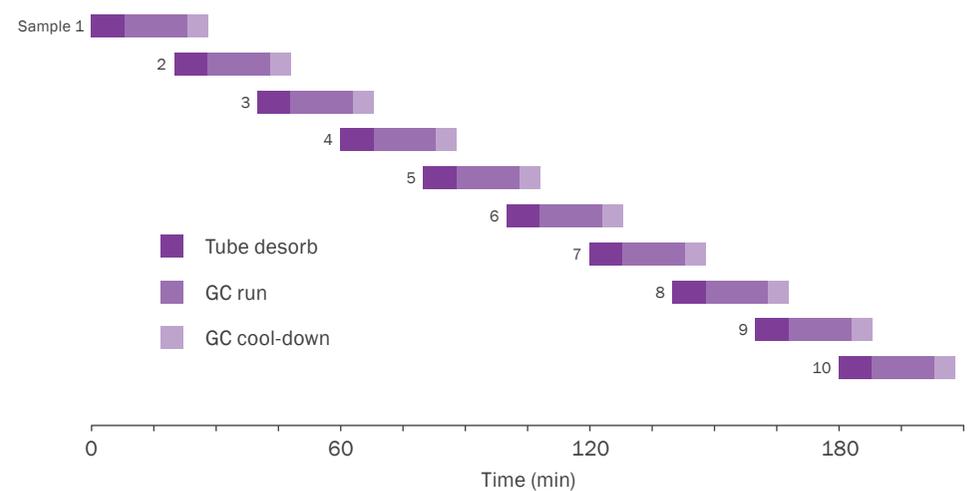
## No overlap – Helium carrier gas



## Overlap mode – Helium



## Overlap mode – Hydrogen



Very significant reduction in cycle times achieved without compromising analyte recovery or separation.

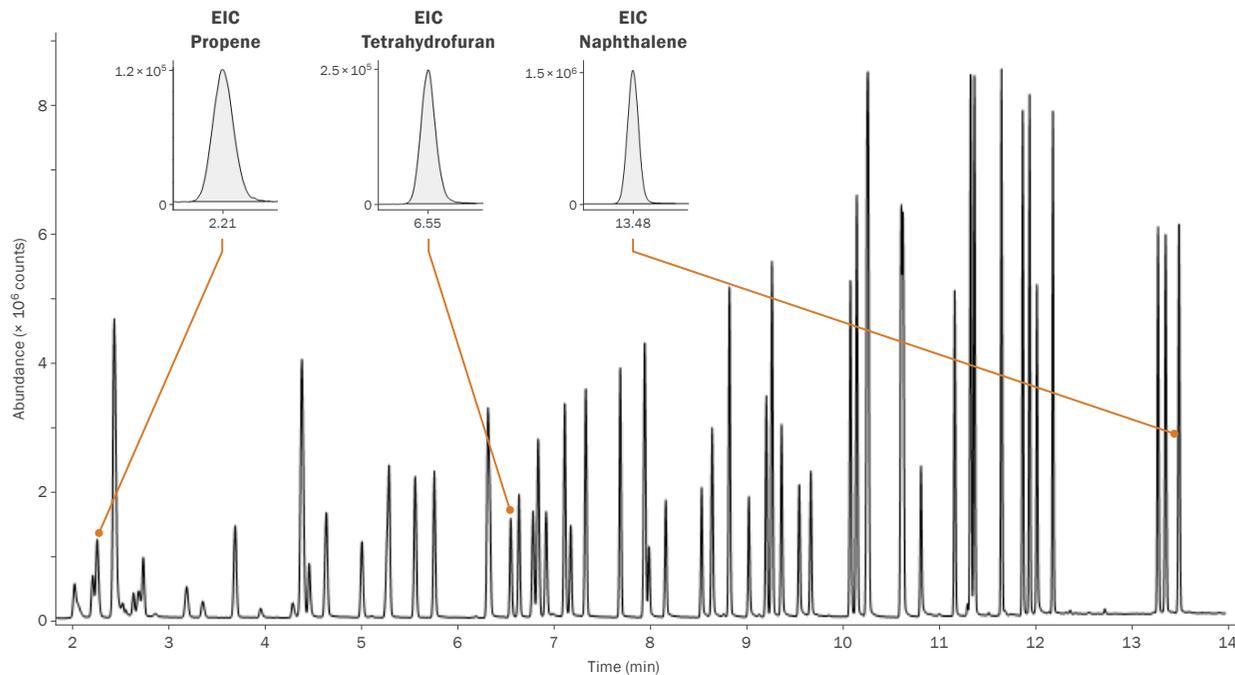
Changing from helium to hydrogen carrier gas typically delivers an additional analysis every hour or ~20 extra billable samples per day. At \$100 per sample this means \$2,000 extra revenue per system per day, or >\$10,000 per week.

# Method performance and method compliance maintained with H<sub>2</sub> carrier gas

Multi-Gas systems leverage all the innovations and advantages of Markes' world-leading range of thermal desorbers to address the widest range of TD applications and comply with international standard methods and guidelines such as ISO 16000-6 and ASTM D6196.

## Exceed all performance criteria for US EPA method TO-17 with hydrogen carrier gas

Extended range of TO-17 VOCs	Linearity R <sup>2</sup>	RRF RSD	Area RSD	RT RSD	MDL (ppb)
Measured average	0.9984	10%	3.8%	0.11%	0.137
Criteria	>0.99	<30%	<20%	<1%	<0.5

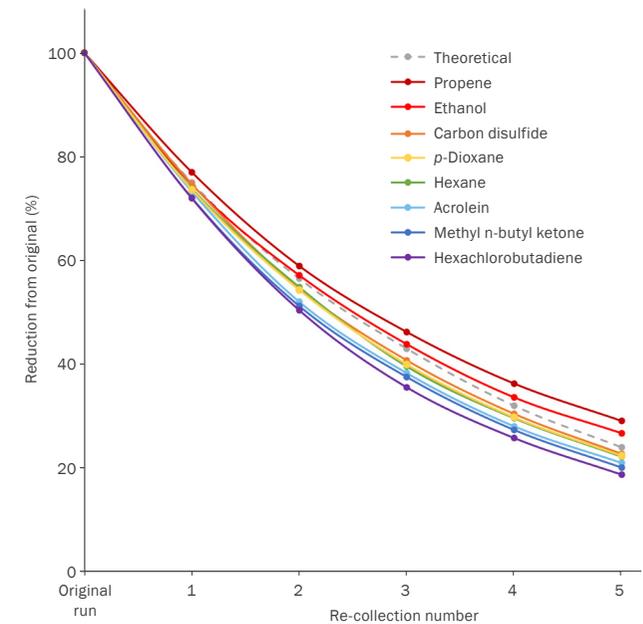


Routine analysis of air toxics by TD-GC-MS with hydrogen carrier gas reduces analytical cycle time to <15 minutes whilst maintaining method performance, method compliance and critical separations across the volatility range.

## Confidence in data quality

The uniformly heated and inert flow path of every Markes thermal desorber minimises risk of reactivity.

Users of Markes' Multi-Gas TD instruments are uniquely well equipped to validate analyte recovery using quantitative sample re-collection and repeat analysis as recommended in standard methods. Selective losses of one or more analytes or generation of degradation products would quickly become apparent during a sequence of repeat runs.



Series of re-collections for example VOCs in a 5 ppb TO-17 standard using H<sub>2</sub> carrier gas shows complete recovery, even for challenging compounds.

## Cost-saving, eco-friendly and future-proof

With helium becoming increasingly difficult and expensive to source for labs around the world, hydrogen provides the ideal low-cost and environmentally friendly alternative. Hydrogen is around 8 times less expensive than helium in like-for-like purity cylinders, and installing hydrogen generators allows costs to be reduced further – eliminating the costs associated with cylinders, freeing up trained staff and reducing the carbon footprint of your lab.

Markes' Multi-Gas enabled TD systems can also be used with helium or nitrogen carrier gas if required, enabling new methods to be developed. If starting with helium, for example, the carrier gas can subsequently be replaced with hydrogen, resulting in faster methods once equivalence has been demonstrated. Installation is risk-free: existing capillary columns, sorbent tubes and focusing traps are all compatible with hydrogen and methods are simple and quick to translate. All necessary leak-tests and software settings are pre-built into the Multi-Gas thermal desorbers.



**Canada:**

**CSA C22.2 No.61010-1**

**USA:**

**ANSI/UL 61010-1**

**IEC/EN 61010-1**

**IEC/EN 61010-2-010**

**IEC/EN 61010-2-081**

**IEC/EN 61326-1**

**CE Mark**

**MET Approved**



Markes' Multi-Gas thermal desorbers have been certified safe for hydrogen operation by an independent UK Test House accredited to provide UKAS, A2LA and RvA certification and 'Notified Body' services to most management systems standards. They further provide third-party approvals for example to NRTL, FCC, the IECCE CB scheme, and CE Marking.

# Markes International – The TD experts

## World-leading instruments, technical expertise and unmatched applications experience

Markes International has been at the forefront of thermal desorption design and innovation for over 20 years. Our 'xr' series of TD instruments sets the benchmark for product quality and delivers the best-available analytical performance across all TD-GC and TD-GC-MS application areas:

**Environmental monitoring**



**Consumer environmental health**



**Food and drink**



**Automotive studies**



**Fragrance and odour profiling**



**Biological profiling**



**Defence and forensic**



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