MARKES international

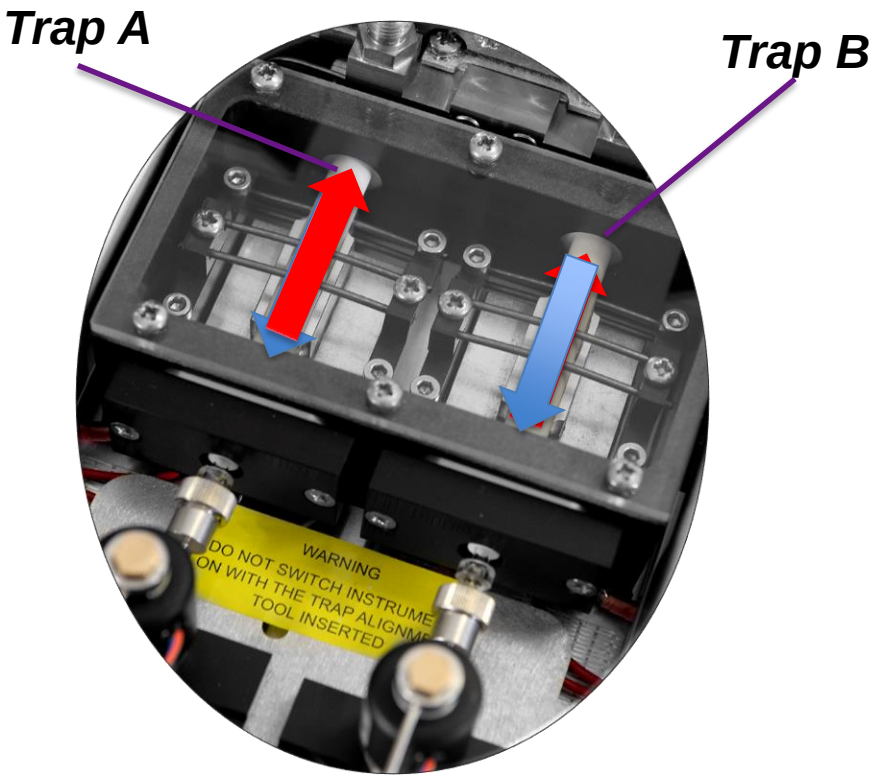
TT24-7xr and TT24-7 Series 2

Cryogen-free twin-trap technology for every continuous on-line air/gas monitoring application

Introducing tandem trapping technology

Continuous, near real-time air monitoring

Two electrically-cooled traps operate in tandem to offer continuous air sampling



1. While trap A is sampling, trap B is desorbed and analysed

2. While trap B is sampling, trap A is desorbed and analysed

Truly continuous air monitoring = complete data coverage, no ‘blind spots’

The TT24-7 instrument range

TT24-7 xr

continuous environmental monitoring of ambient or workplace air

- Low flow sampling: 2 – 250 ml/min
- A dedicated sample inlet for each trap
- Advanced water management options
- Stream selection between sample, calibration standard and blanks
- Internal standard addition option

TT24-7 Series 2

continuous monitoring for chemical agents in military or civilian locations

- High flow sampling: 20 – 800 ml/min
- Common sample inlet
- Fast agent detection at ultra-low levels

The TT24-7 instrument range

TT24-7 xr

continuous environmental monitoring of ambient or workplace air

- Industrial safety
- Atmospheric chemistry
- Diurnal variation
- Process QC
- Evolving fragrance or bio emission profiles
- Source apportionment

TT24-7 Series 2

continuous monitoring for chemical agents in military or civilian locations

- Monitoring agent destruction & storage facilities ‘demil sites’
- Civil defence – e.g. agent detection in key public buildings
- Evaluating protective equipment
- First responder vehicles

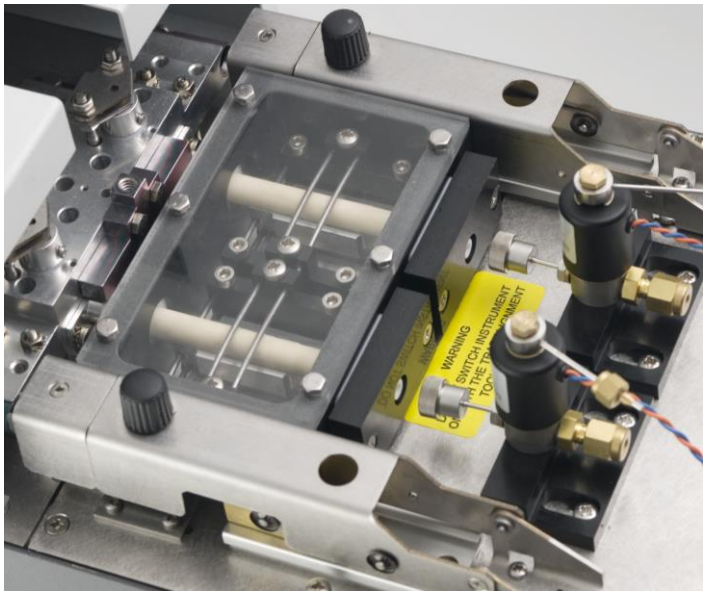
Summary: the TT24-7 Series 2

- Tandem-trap continuous monitoring – **100% data capture.**
- **Operates cryogen-free** – ideal for unattended remote-site operation over extended periods.
- **Highly time-resolved data** – cycle times as low as 3–5 minutes offer near real time monitoring.
- **High sample flow rates** for maximum sensitivity with short cycle times
- Small footprint – suitable for **mobile laboratories**.
- **Software optimised for in-field monitoring** – automatic restart and remote troubleshooting
- Compatible with any make of GC(MS) and fast GC.

TT24-7 Series 2

TT24-7 Series 2 unique features

- Single sample inlet
- High sampling flows 20 – 800 mL/min



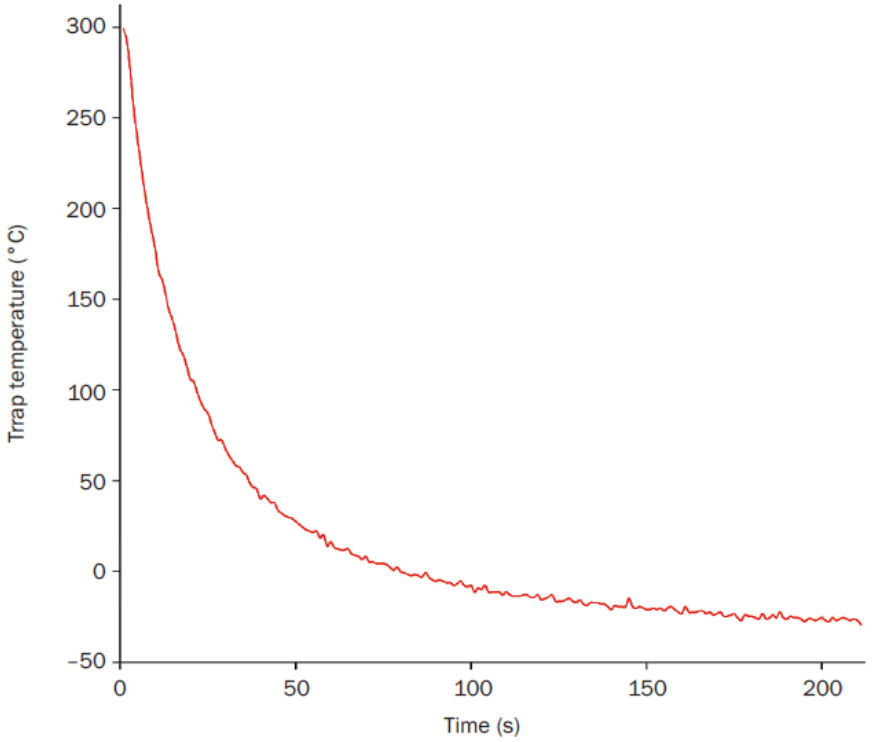
TT24-7 Series 2 Optional accessories

- Second MFC for electronic control of split flows
- Nafion dryer for water removal
- 2m heated sampling line (up to 200 °C)

Highly time resolved data

Fast cycle time → Early warning → Monitor events

- High sample flow rates
  - Wide-bore traps
  - Optimised flow path
  - Sapling flow rates up to 800 mL/min
- Fast trap desorption
  - Up to 50 ° C/s
  - 1-2 minutes
- Fast trap cooling
  - 300 to 25 ° C in 1 minute

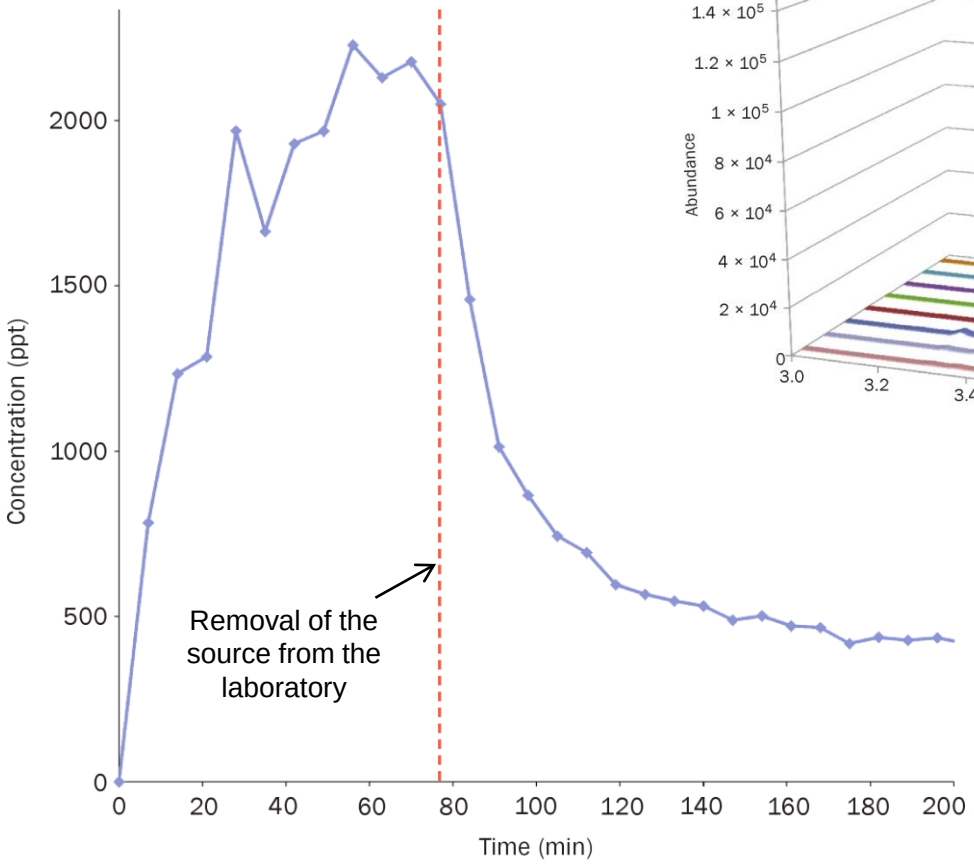


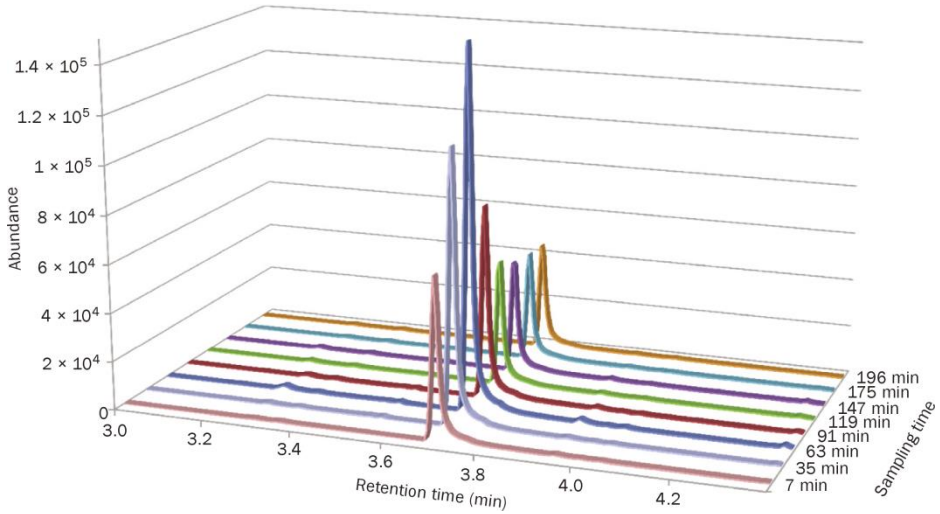
The rapid cooldown of traps in the TT24-7 Series 2 greatly facilitates short cycle times.

TT24-7 Series 2

Applications: CW simulants

- Continuous monitoring of Methyl salicylate (mustard simulant) after exposure event





Time profiles showing the rapid rise and gradual decay of methyl salicylate in laboratory air.

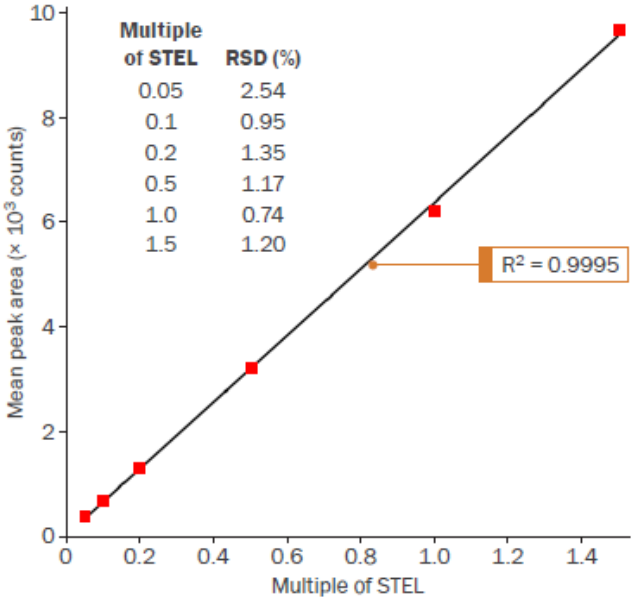
Source: A 2 cm^2 tissue spiked with 100 µL of methyl salicylate, placed 5 ft from the sample inlet of the TT24-7 Series 2.

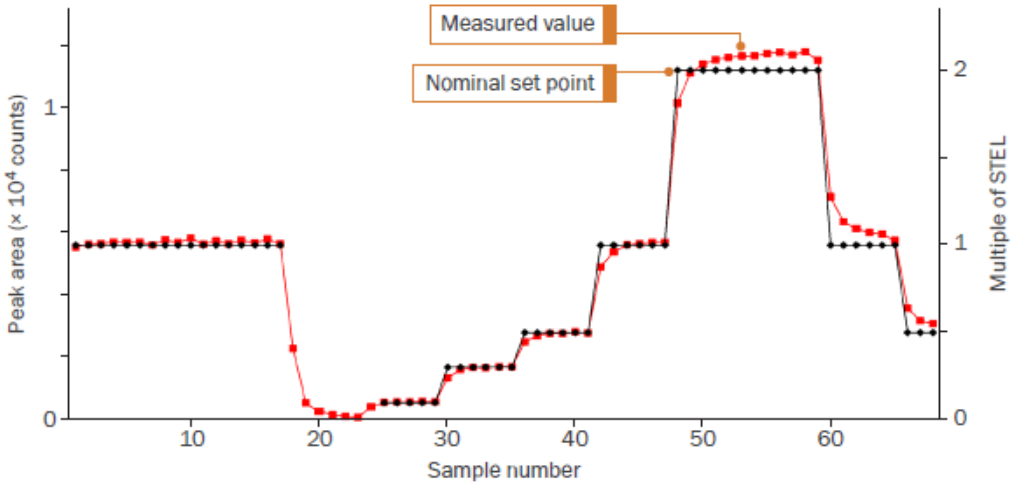
Near-real time monitoring with TT24-7 Series 2

Continuous on-line monitoring of sarin

In-situ testing of TT24-7 Series 2 with nerve agent vapour at varied levels.

Excellent linearity at and below US short term exposure limit



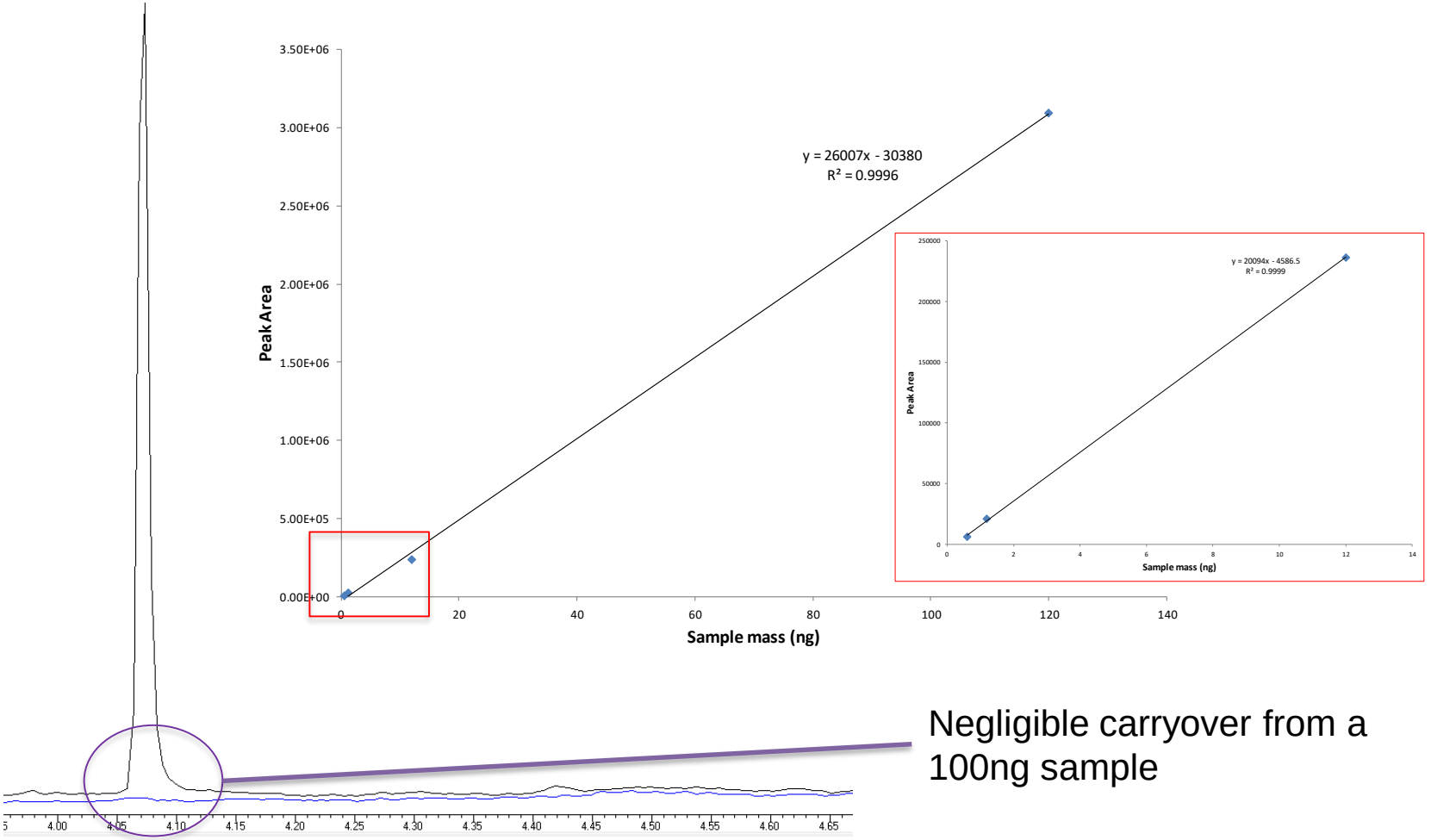


Sarin concentrations closely tracked using TT24-7 Series 2

TT24-7 Series 2

Applications: CW simulants

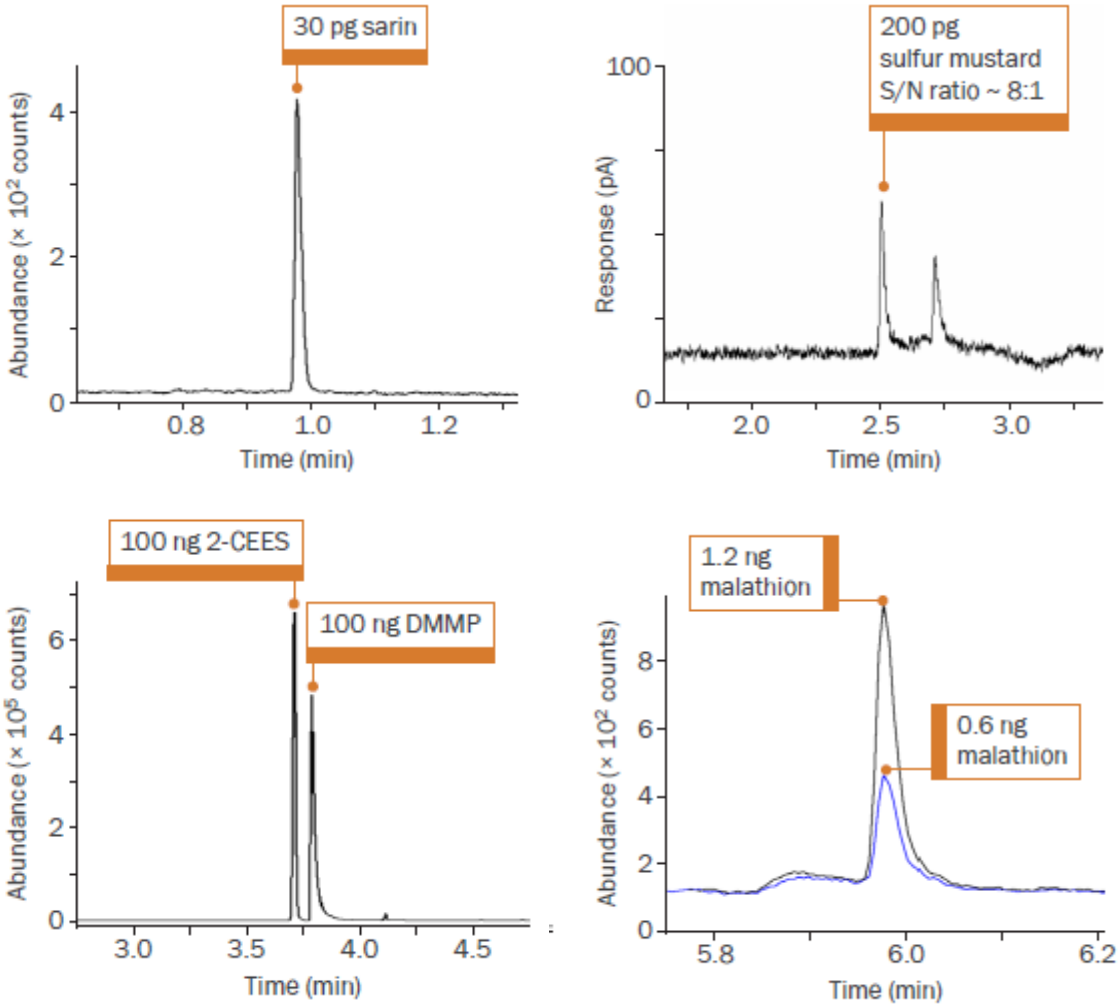
- Excellent peak shape and linearity for VX simulant ‘malathion’



Negligible carryover from a 100ng sample

Detecting trace-level agents

Toxic chemical standards at ng or pg levels



Software control

NEW: TT24-7 xr and TT24-7 Series 2 both supported in Markes Instrument Control (version 1.5)

- Continuous sampling
  - Continuous, near-real time atmospheric sampling
  - While one trap is sampling the other is desorbed
  - TT24-7 xr also includes sampling from calibrant and blank channels
- New trap heat mode
  - Either trap can be desorbed without collecting sample on the other, simplifies method development protocols
  - Multi stage trap desorption for conditioning multi-bed traps
  - New / contaminated traps may be conditioned without sampling on the other trap
- Single tube desorption
  - 2 (3) stage desorption of industry standard sorbent tubes
  - User can specify which cold trap is used
- Automated leak test
  - Leak tests the whole system and, in the event of a failure, automatically runs a series of tests to isolate the leak location to an area of the instrument
  - Can be run as part of a sequence, on passing the sequence continues, on failure the sequence stops

Software control

NEW: TT24-7 xr and TT24-7 Series 2 both supported in Markes Instrument Control (version 1.5)

- Advanced sequencing
  - Multiple methods / operating modes in the same sequence
  - Unlockable parameters allow single method parameters to be ‘unlocked’ to the sequence table – removes the need for multiple methods
  - Add, skip and insert priority samples into a live sequence (note: not recommended for continuous monitoring sequences)
  - Dedicated method development mode
  - Repeating sequences
    - No need to make long sequences
    - Specify number of repeats or run continuously until user intervention

	Sample Type	Comment	Method	Sampling Trap	Desorption Trap	Sample Gas
1	Sample		TD - Continuous Sampling	TrapA		AIR
2	Sample		TD - Trap Heat		TrapA	
3	Sample		TD - Tube Desorption			
4	Sample		TD - Leak Test			

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