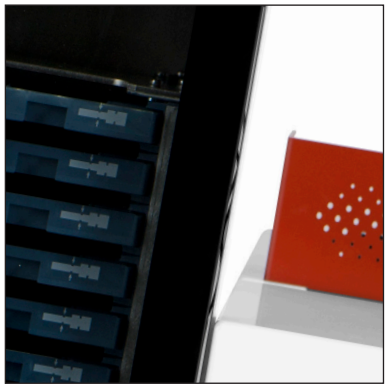
MARKES international

ULTRA-xr

100-tube autosampler for unattended high-throughput thermal desorption analysis



Distribuido en España por:

IngenieríaAnalítica
Chromatography & Spectrometry

THE QUEEN'S AWARDS FOR ENTERPRISE: INTERNATIONAL TRADE 2015

Tel: (+34) 902.45.6677 Fax: (+34) 902.46.6677 www.ingenieria-analitica.com inf@ingenieria-analitica.com

ULTRA-xr™

Introducing the new ULTRA-xr 100-tube autosampler – for high-productivity analysis of trace-level volatile and semi-volatile organic compounds (VOCs and SVOCs) by thermal desorption with GC or GC–MS.

Like the other members of the new ‘xr’ series from Markes International, the ULTRA-xr incorporates the latest technical advances as well as every innovation of the last 20 years from Markes, making it perfect for a wide range of sample types and applications.

Used with the UNITY-xr, the ULTRA-xr gives you the following advantages compared to every other thermal desorber on the market:

- **Ex**tended **re**-collection
- **Ex**tended analyte **r**ange
- **Ex**tended **r**eliability.

Outstanding productivity

Automated, cryogen-free, unattended operation for up to 100 sample tubes.

Method-compliance

Robust design accommodates standard 3½″ sample tubes.

Unbeatable application versatility

Compatibility with a variety of analytes over a wide concentration range makes the UNITY–ULTRA-xr ideal for most TD–GC–MS applications.

Superior sample integrity and traceability

- Confidence in results through quantitative sample re-collection of split flows.
- Method compliance aided by leak-testing, water management and addition of internal standard.
- Enhanced traceability of samples using barcodes and RFID TubeTAGs.

Enhanced reliability

High-precision parts result in increased robustness.

Unparalleled productivity and analytical quality

UNITY–ULTRA-xr – Extending the capability of standard TD

Four key advantages are offered by these systems:

Maximum sample throughput

Robust, efficient automation of up to 100 tubes in a single sequence extends the efficiency of laboratories using UNITY-xr systems. The autosampler minimises analytical cycle times by allowing desorption of a second tube onto the focusing trap while GC analysis of the first sample continues (overlap mode).

Automated, quantitative sample splitting and re-analysis

UNITY-xr offers quantitative re-collection of all split flows, for repeat analysis of critical samples and/or method validation. Adding one ULTRA-xr automates re-collection of the outlet split, while a second ULTRA-xr automates re-collection of both outlet *and* inlet splits – a capability that is unique to Markes.

Extended analyte range

The uniformly inert flow path of the UNITY–ULTRA-xr – in conjunction with tube and trap backflushing and use of optimised sorbent combinations – allows quantitative recovery and re-collection of C_2 to C_{44} (including reactive and thermally labile species), from percent to sub-ppt concentrations.

Excellent reliability

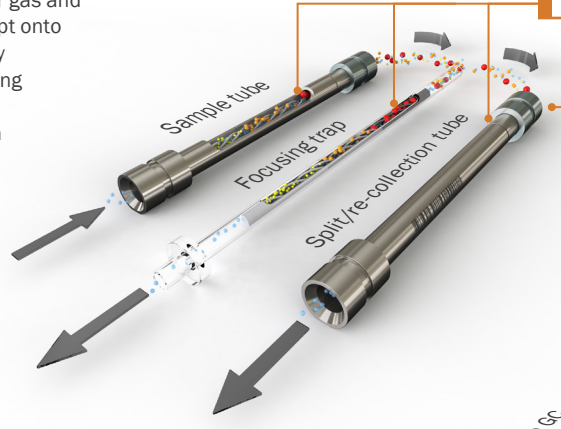
Field-proven reliability and mechanically-simple automation ensures robust operation, while method compliance is aided by leak-testing, water management and internal standard addition (ISDP capability).

How two-stage thermal desorption works

Sample tubes and traps can contain multiple sorbents, for analysis of an extended range of analytes.

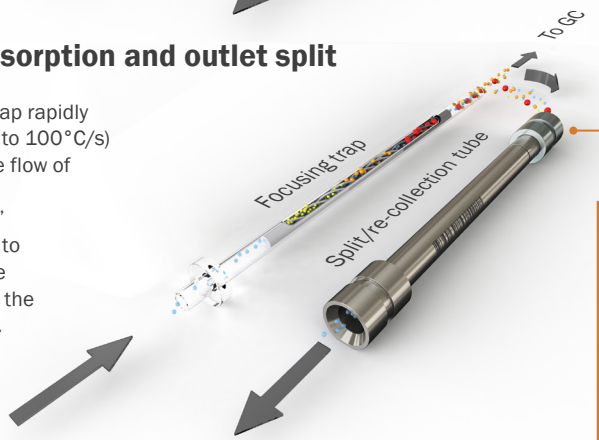
1 Tube desorption and inlet split

Sample tube heated in flow of carrier gas and analytes swept onto an electrically cooled focusing trap, typically held between ambient and –30°C.



2 Trap desorption and outlet split

Focusing trap rapidly heated (up to 100°C/s) in a reverse flow of carrier gas ('backflush' operation), to transfer the analytes to the GC column.



During either stage, the flow of analytes can be split and re-collected onto a clean sorbent tube.

Advanced automation technologies

Enhanced re-collection options for superior sample security and confidence in results

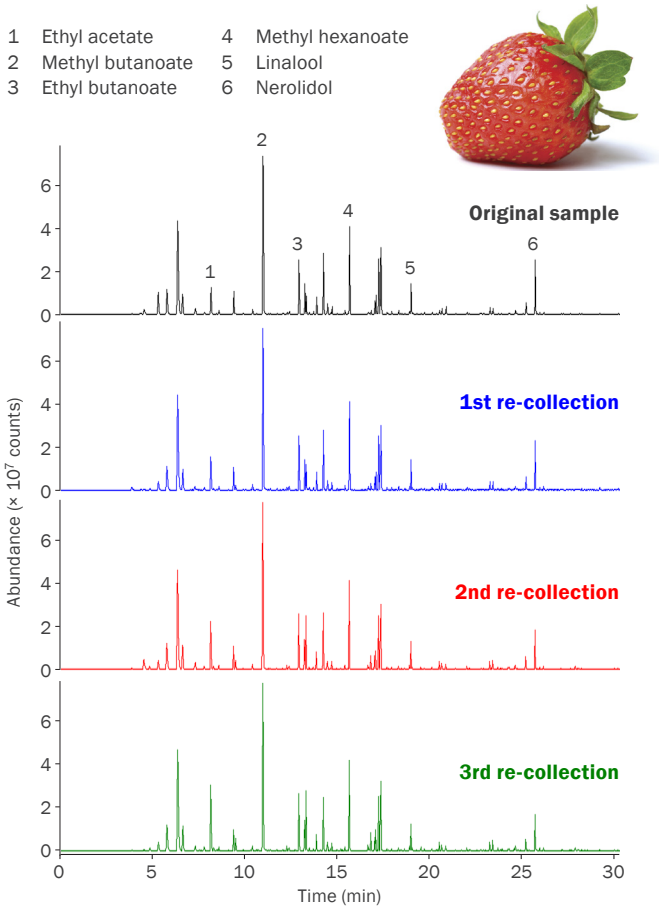
Every UNITY-xr system comes with the unique ability to split samples during tube and/or trap desorption, and re-collect the split portions onto clean sorbent tubes. This capability:

- Allows valuable samples to be re-analysed, overcoming the historic 'one-shot' limitation of thermal desorption.
- Allows complete analyte transfer to be validated, ensuring compliance with standard methods.
- Aids method development and troubleshooting.

ULTRA-xr automates all these processes – streamlining the handling of large numbers of samples while giving you utmost confidence in results. Furthermore, the modularity of Markes' systems makes it easy to add one or two ULTRA-xr autosamplers:

	UNITY-xr	UNITY–Air Server-xr	UNITY-xr–CIA *Advantage*
	Single-tube thermal desorber	**On-line VOC monitoring system**	**Automated canister/ bag autosampler**
+ ULTRA-xr	**Added capability for:** ■ 100-tube automation. ■ Automated re-collection of outlet split flows. ■ Automated re-collection of canister and on-line samples. ■ Fully automated sequencing for tubes and canisters/bags.		
+ ULTRA-xr	**Added capability for:** ■ Automated re-collection of both outlet *and* inlet split flows. ■ Automated re-collection of split flows from all 100 tubes onto 100 clean tubes.		

Repeat analysis for method validation



Quantitative analysis of the aroma profile of fresh strawberries is confirmed by three successive re-collections and repeat analyses of the same sample, each collected onto a clean sorbent tube.

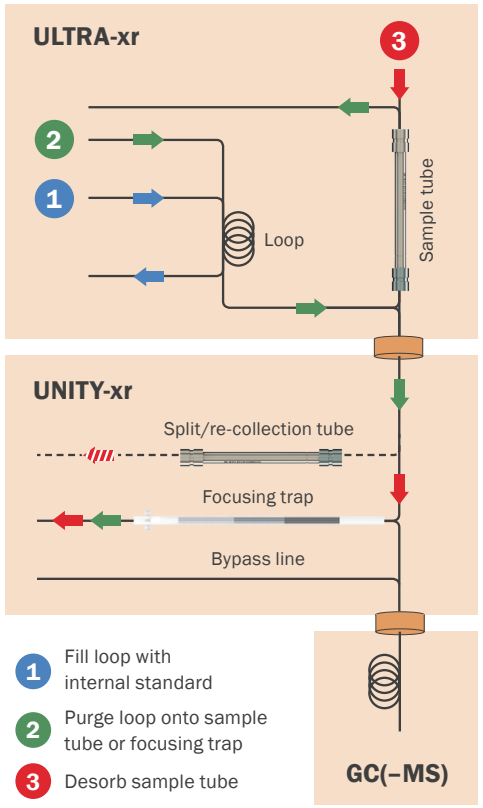
Innovation and excellence in thermal desorption

Key features of ULTRA-xr for enhancing quality and boosting productivity

Internal standard/dry-purge (ISDP) capability

The optional ISDP capability of the ULTRA-xr offers the following advantages:

- **Adding an internal standard to a sorbent tube** is widely used for quality-checking, and involves transferring a precise aliquot of the gaseous standard from a gas valve loop to the sampling end of the tube. This can be done immediately before tube desorption, and/or before the tube is sampled – allowing every aspect of the monitoring process to be checked, from tube storage and transport to sampling and analysis.
- **Adding an internal standard to a focusing trap** is equally straightforward, and can be useful for direct desorption.
- **Dry-purging of sorbent tubes** on the ULTRA-xr is carried out in the sampling direction as part of the automated sequence. This minimises water interference and is recommended by standard methods.

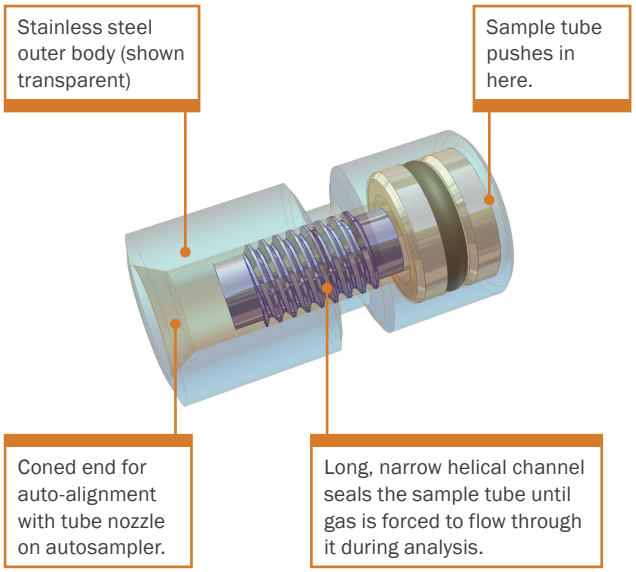


For versatile method validation, internal standards can be added to tubes or focusing traps on all ULTRA-xr systems.

DiffLok caps for stringent sample sealing

Markes' patented DiffLok caps preserve sample integrity, using a long, narrow, helical channel to prevent diffusive loss of sample or ingress of contaminants from the environment.

The caps are simply pushed on to both ends of every tube, and remain in place throughout automated TD sequences, overcoming the need to uncap and recap tubes.



Enhanced sample traceability

Sorbent tube tagging and tracking for optimum chain-of-custody

Markes' TubeTAG system uses read/write programmable radio-frequency identification (RFID) tags on sorbent tubes, to ensure that tube and sample information is reliably recorded at every step of the sampling and analysis process.

The TubeTAG system:

- Ensures fail-safe tracking of samples in transit from field to laboratory, and within a laboratory.
- Prevents manual transcription errors, optimising the audit trail and eliminating any risk of litigation.
- Simplifies workflow and enhances productivity on multi-tube automated TD systems.
- Is compatible with glass, inert-coated or stainless steel tubes.

How TubeTAG works

1 The tag is attached to the tube, and tube-related information is uploaded.

Typical information entered onto the tag in the laboratory (before field sampling) includes:

- The tube serial number.
- Sorbent details & packing date.
- Date of shipping to the field.
- Project name.
- Billing code.

2 The tagged tube is sent to the field, and information about sampling conditions is uploaded to the tag.

Typical parameters recorded on the tag during field sampling include:

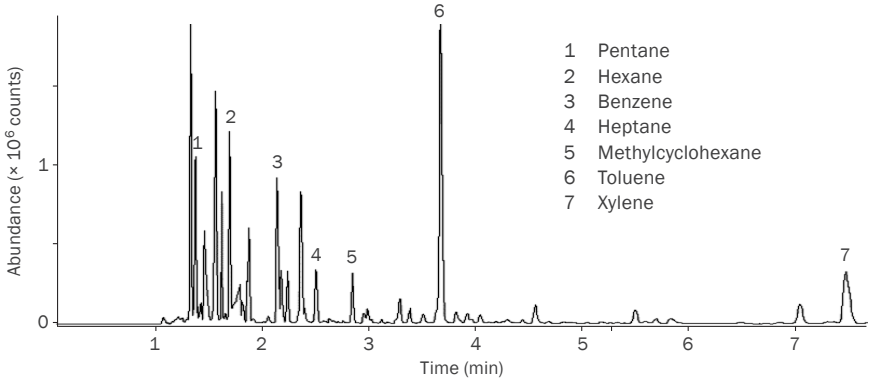
- Sampling location.
- Uptake rate or flow rate.
- Sampling start/end time & date.

3 The thermal desorption system automatically retrieves the tube and sample data, and analyses the sample.

During analysis, the tag is updated with:

- New number of analytical cycles.

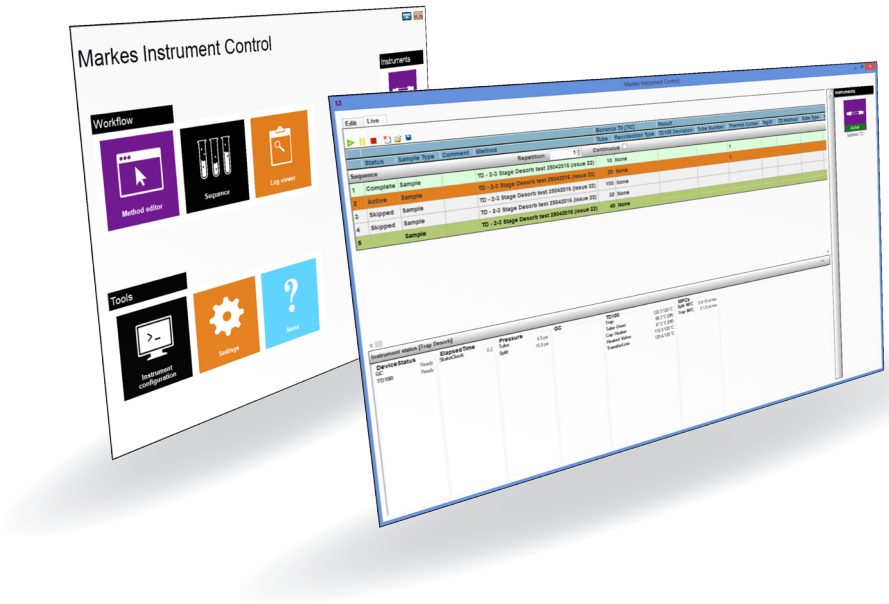
Method-compliant approaches to tube traceability



The use of RFID tags such as TubeTAG is recommended by US EPA Method 325, which describes the passive monitoring of VOCs at refinery fencelines (illustrated here with a 2-week passively-monitored sample). Use of TubeTAG at each stage of the sampling and analytical protocol ensures the robust 'chain-of-custody' demanded by the method.

Markes Instrument Control

Easy-to-use software for the new ‘xr’ series



The new software used to control the ULTRA-xr and the other members of the ‘xr’ series offers the following features for enhanced laboratory productivity:

- **Editing of active sequences,** for greater flexibility and ease of use.
- **Rapid set-up of TD methods** using pre-programmed parameters for standard methods including VDA 278, US EPA TO-17 and US EPA 325.
- **Pre-loading of an internal standard** on a tube or trap, for enhanced quantitation.
- **System self-checking,** for improved diagnostics.

Unmatched product range

A comprehensive range of sorbent tubes and sampling accessories for every TD application

Micro-Chamber/Thermal Extractor™ for fast and flexible sampling of chemicals and odours released from materials and foods.

ACTI-VOC™ pump – optimised for sorbent tube sampling.

MTS-32™ for pumped sequential sampling onto multiple tubes.

Easy-VOC™ for simple, rapid ‘grab-sampling’ of air/gas.

VOC-Mole™ for soil gas sampling.

TubeTAG™ – RFID tags for ultimate tube traceability and quality assurance.

Sample tubes – Stainless steel, glass or inert-coated, individually barcoded and with single- or multi-bed sorbents for maximum application versatility.

Brass storage caps for ultimate sample integrity.
DiffLok™ caps for tubes on autosampler.
Diffusion caps for passive sampling.

Markes International – The TD experts

World-leading instruments and unmatched expertise in VOC and SVOC monitoring

Markes International has for 20 years been at the forefront of innovation for enhancing the measurement of trace-level VOCs and SVOCs by thermal desorption–gas chromatography. Our suite of instruments for thermal desorption sets the benchmark for quality and reliability:

UNITY-xr™
Single-tube thermal desorber featuring sample re-collection of all split flows.

TD100-xr™
High-throughput 100-tube automated thermal desorber.

UNITY–Air Server-xr™
Versatile on-line VOC monitoring system.

CIA *Advantage*™
Cryogen-free automated canister autosampler and pre-concentrator.

TC-20 & TC-20 TAG™
Cost-effective systems for off-line multi-tube conditioning and dry-purging.

TT24-7™
Twin-trap instrument for near-real-time on-line monitoring.

Micro-Chamber/Thermal Extractor™
Unique sampling device for emissions of VOCs and SVOCs from products and materials.

L0041 (200516-4)
Product names used with the ™ symbol are trademarks of Markes International.

Markes International

UK: Gwaun Elai Medi-Science Campus, Llantrisant, RCT, CF72 8XL **T:** +44 (0)1443 230935

US: 11126-D Kenwood Road, Cincinnati, Ohio 45242
2355 Gold Meadow Way, Gold River, Sacramento, California 95670 **T:** 866-483-5684 (toll-free)

Germany: Schleussnerstrasse 42, D-63263 Neu-Isenburg, Frankfurt **T:** +49 (0)6102 8825569

E: enquiries@markes.com **W:** www.markes.com