

Markes International ULTRA 2™ thermal desorption autosampler

Specification Sheet February 2008



To be read in conjunction with USpec, the UNITY 2™ specification sheet

SYSTEM SUMMARY

The UNITY 2 Thermal Desorber is designed to analyse single, 3.5-inch (standard) or 4.5-inch (DAAMS) sample tubes with or without RFID tags. The ULTRA 2 autosampler connects to series 1 or 2 UNITY and allows up to 100 tubes to be desorbed and analysed sequentially. Two versions of ULTRA 2 are available:

1. accommodates 3.5-inch (89 mm) (standard) tubes with ¼-inch O.D.
2. accommodates 4.5-inch (115 mm) (DAAMS) tubes – either 6 mm O.D. or 10 mm O.D with 6 mm ends

Tubes on ULTRA 2 are contained in 10 trays each holding up to 10 tubes. Whilst on ULTRA 2, all tubes are capped and sealed at both ends with patented* DiffLok™ caps. These eliminate ingress of atmospheric vapours *via* diffusion and prevent loss of retained volatiles while samples are waiting for analysis.

DiffLok caps provide a much more effective seal than push-on PTFE caps used on some automated TD systems¹.

DiffLok caps do not need to be removed by the instrument prior to analysis as they allow a flow of gas through the tube when pressure is applied. This simplifies mechanical operation making ULTRA 2 very reliable. The sample flow path through the cap at the sample outlet end is heated and inert coated to prevent condensation and make it completely inert.

Primary desorption of each tube takes place on the ULTRA 2 autosampler under control of the Windows™ compatible sequencing software. Tubes are moved into position inside the static desorption oven and sealed into the carrier gas stream with a minimum of simple robotic operations.

Desorbed vapours are transferred in the gas stream, through a short, inert, heated transfer

line to the focusing trap of series 1 or 2 UNITY for subsequent secondary desorption and analysis. UNITY controls the carrier gas through ULTRA 2 and takes care of any sample splitting during both primary (tube) and/or secondary (trap) desorption steps. For details of this part of the desorption process see the UNITY 2 specification sheet.

Standard series 2 ULTRA-UNITY™ systems offer manual SecureTD-Q™ for re-collection and repeat analysis of critical samples or for use during method development/validation.

The SecureTD-Q process may be automated by either the addition of an ULTRA 50:50 module for re-collection onto the same autosampler or by the addition of a second ULTRA 2 autosampler and a connection kit to the split side of UNITY 2 to give a fully automated series 2 AutoSecure TD™ system.

ULTRA 2 features:

- **100 tube capacity** offers extended unattended operation over an entire week end for optimum productivity
- Option of **integrated tubeTAG** read/write capability for enhanced tracking of tube history
- ULTRA 2 simply adds automation to the **peerless analytical performance** of UNITY 2
- Tubes are **sealed** using patented DiffLok caps to prevent ingress of contamination and loss of volatiles both before and after analysis
- Minimal linear robotic movements required for operation, thus increasing **reliability**
- Versions available for **standard and DAAMS tubes**
- **Versatility and throughput:** software allows multiple sets of tubes, requiring different TD methods, to be linked together in a single automatic sequence.

SPECIFICATIONS:**Primary (Tube) Desorption Oven**

- Temperature range 50°C to 425°C (Max: 395°C on units shipped before July 2008)
- Settable in 1°C increments
- Desorption time 0 to 999.9 mins
- Settable in 0.1 min increments

Pre-desorption checks and controls

The pre-desorption checks and controls are as for UNITY 2. However the leak test is automated such that if a tube fails, it is replaced in its position in the tray. The DiffLok caps maintain the integrity of the failed tube. A 'blank' GC run is then triggered (this keeps the GC(MS) sequence in synchronization with the desorber) and the system goes on to the next tube in the sequence.

The position of the tube that failed the leak test is stored in system memory and included in the run log file. At the end of a sequence, the system presents a log file for the sequence, including leak test failures. Log files may be stored indefinitely.

If three tubes fail the leak test in succession, a system error is reported and the instrument stops and waits for operator intervention.

Automatic sequencing of tubes

A sequence of tubes comprising several 'sets' may be entered into the sequence table via the user interface on the PC. Tubes may be included in more than one set in a sequence.

A set normally comprises a series of tubes which are to be analysed by the same desorption method. Multiple (up to 100) desorptions may be carried out on each individual tube. An entire sequence can be recycled any number of times as required.

Individual tubes may be identified as calibrant, blank or sample.

The sequence may be viewed in the convenient 'Sequence Viewer' screen both before initialising the run and whilst a sequence is in progress. A 'comma separated values' log file is produced and appended-to as the sequence progresses.

Any sequence deviations are recorded to the log file. If any deviations occur in a sequence, for example leak test failure or missing tube, the GC run is initiated to keep the analytical system in synchronisation with the desorber. Sequences may be stored and recalled for re-use.

Tube conditioning mode is available on series 2 ULTRA-UNITY configurations allowing automated, sequential tube conditioning without risk of trap contamination.

SYSTEM SPECIFICATION**Dimensions and Weight****3.5-inch tube version**

- Height: 62 cm (24.5 in)
- Width: 24 cm (9.5 in)
- Depth: 53 cm (20.9 in)
- Weight: 23 Kg (51 lb) unloaded, 28 Kg (60 lb) fully loaded with 100 capped tubes

4.5-inch tube version

- Height: 62 cm (24.5 in)
- Width: 27 cm (10.5 in)
- Depth: 53 cm (20.9 in)
- Weight: 23 Kg (51 lb) unloaded, 28 Kg (60 lb) fully loaded with 100 capped tubes

Environmental Conditions

- Ambient operating temperature 15°C to 30°C
- Ambient operating humidity 5 to 95% RH non-condensing

Number of Tubes

100-tubes can be housed in 10 trays

Power Requirements

- 90 to 253V, 47/63 Hz (ULTRA 2 self-adjusts to local voltage input e.g. UK 220-250V, US 110-120V)

Heat Output During Operation

- Power supply unit rated to 650W.
- Input inrush current of <40 amps

ULTRA 2 Safety and Regulatory Approvals

- EN 60950-1
- EN 61010-1
- CE marked and compliant with the Low Voltage Directive (73/23/EEC) EN60950.

EMC Performance

- Emissions EN61326
 - Conducted Class A
 - Radiated Class A

ULTRA 2 is designed and manufactured under a quality system registered to ISO 9001.

ULTRA 2 power supply (PSU) conforms to the following safety approvals:

- UL60950-1 & CSA22.2 No. 60950-1 – UL Recognised. C-UL for Canada
- IEC/EN60950-1 BSI Kitemark and CE mark.
- IEC/EN61010-1 and IEC/EN60601-1. CB Report and BSI Kitemark
- UL60601-1 & UL61010-1-UL Recognised, C-UL for Canada

Data System – Minimum PC Specification

As for UNITY 2, except that two serial ports are required. Note that if insufficient serial ports are available on the control PC, additional ports can simply be added using either a USB hub and USB to serial cables or a PCI card.

ULTRA 2 Software

If the ULTRA 2 is to be added to an existing series 1 or 2 UNITY installation, it will have been shipped with current Markes International TD Control Software. Use this software to replace any older versions of TD software.

Control software for series 2 ULTRA-UNITY TD systems includes configuration options, desorption methods, sequence generation, sequence logging and system status viewing functions.

Electrical connections

As well as the standard connections included with UNITY 2, ULTRA 2 is shipped with its own power lead and RS-232 PC cable

ULTRA 2 Options:

- **TubeTAG read/write** module for ULTRA 2. User installable
- **ULTRA 50:50***: The addition of a "50:50" module to ULTRA 2 allows the automated re-collection of trap desorption (outlet) split flow for up to 50 or 100 tubes using a single ULTRA 2 autosampler. Series 2 ULTRA 50:50 systems also facilitate automated dry purging of tubes.
- Series 2 ULTRA 50:50 systems can be configured with one or two integrated **mass flow controllers** if required
- **AutoSecure TD System**: The addition of a second ULTRA 2 autosampler and connection

kit will fully automate the SecureTD-Q function (quantitative re-collection of both inlet and outlet split for all 100 samples onto clean conditioned tubes.)

- Series 2 ULTRA or ULTRA 50:50 autosampler pre-configured with **Internal Standard Addition/Dry Purge accessory**: Allows the introduction of 1 ml of gas phase standard onto the inlet end of a blank or sampled tube. Also facilitates automated dry purging of tubes.

For further information

For more information about Markes products and services please visit our web site at www.markes.com

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¹ Losses from the ATD 400, PP. Ballesta, The Diffusive Monitor, Issue #9, Nov 1997

* Patented - # GB 2395785. NB: 50:50 module not available on 4.5-inch versions of ULTRA 2

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