

**DANI**

A SCENT OF FUTURE

*Master* TD  
THERMAL DESORBER

OUTSTANDING SENSITIVITY

MAXIMIZED AUTOMATION AND CAPACITY

GREEN, SAFE, AND COST-EFFECTIVE TECHNIQUE

SYSTEM COMPLETENESS



*Master*  
**Master TD**  
THERMAL DESORBER

## Ultimate Solution for High Sensitivity Detection of Volatiles

The DANI MASTER TD Thermal Desorber offers superior sensitivity, versatility, and productivity for the extraction of volatile and semi-volatile compounds from air and solid matrices.

The excellent analytical performance of the system is guaranteed by the two-stage thermal desorption process and supported by the patented "Instant Desorption" of the trap. This design assures the complete transfer of the analytes and their injection into the analytical column in a narrow band to preserve chromatographic resolution and accuracy.

Solid samples are placed directly into the sampling tubes, while gaseous matrices are sampled into tubes filled with one or more sorbent materials or sampled straightly onto the trap by using the MASTER Air Sampler, which automates the sampling from ambient, gas streams, canisters or sampling bags.

When compared with liquid extraction, the higher recovery of the volatiles and their optimal injection result in unmatched sensitivity. MASTER TD offers an outstanding increase in sensitivity (up to 1,000 to 10,000 times) and a superior desorption efficiency (over 95 % recovery of all volatile compounds). In addition, the technique benefits from the reduced sample manipulation and the cost-effective reutilization of the sampling tubes. The fully automated control of the system provides high sample capacity and optimal sampling tube processing for maximum system productivity.

The intuitive control through the TD Manager software offers a complete automated solution. The easy and flexible management of all operating parameters and analytical conditions permits unattended analysis of up to 50 samples.

The MASTER TD, combined with the MASTER GC, is the solution of choice for air monitoring (indoor, workplace, and ambient air) and for the analysis of soil, polymers, packaging materials, etc.

In addition, the MASTER TD meets and exceeds specifications given in the U.S. EPA (TO-14, TO-15, and TO-17), as well as other international regulations.

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# Master

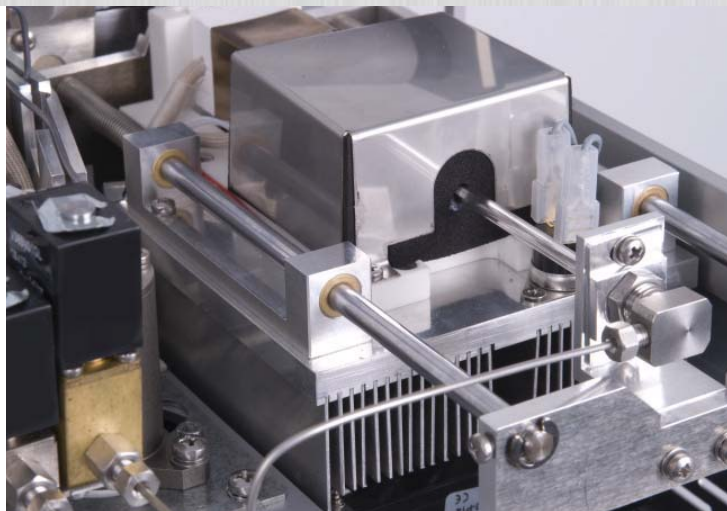
## Outstanding Sensitivity

Superior sensitivity is obtained through the two-stage thermal desorption process: the sampling tube is heated and the volatile and semi-volatile compounds are enriched on the sorbent trap. The patented "Instant Desorption" provides rapid analyte transfer boosting chromatographic performance.

Unlike other TD systems, the MASTER TD performs an instantaneous heating of the trap through an ingenious built-in device that assures the transfer of analytes as a narrow band into the GC column. In addition, backflush desorption of the trap further improves the efficiency of analyte transfer and permits the use of multi-layer traps.

The electrical cooling of the sorbent trap, reaching  $-40\text{ }^{\circ}\text{C}$ , offers advantages to almost every application, allowing to work without cryogenic liquids to retain very volatile compounds and to avoid the risk of ice formation. Additionally, the high temperature desorption capacity permits the extraction of analytes with volatility equivalent to that of n-C<sub>44</sub> hydrocarbons.

A built-in and programmable Dry Step system can be used to remove humidity from the tube prior to desorption. In addition, the option to split the flow at the trap inlet allows the sampling of highly concentrated and extremely humid samples. Furthermore, the inert material of the entire sample flow path prevents carry-over effects, corrosion, and sample loss caused by adsorption and reactivity.



## Maximized Automation and Capacity

The MASTER TD uses standard size stainless steel, glass, and coated steel reusable tubes (all 1/4-inch O.D. x 3.5-inch length), and also canisters, and bags. DANI offers empty and pre-filled tubes with a wide range of sorbent materials; single and multi-layer fillings are available. All tubes are compatible with axial diffusive and pumped samplings. Radiello® air sampling cartridges are also supported.

The thermal desorber allows to run up to 50 tubes sequentially and unattended with enhanced precision and accuracy, providing increased sample throughput and decreased cost per sample.

To avoid sample loss each desorption process is preceded by an automated and effective tube leak test; failed tubes return to the carousel and their number is stored in a Log file. In addition, GC ready conditions are double-checked before both tube and trap desorption.

To prevent from contamination, degradation, and sample loss, tubes are sealed with septa and caps that are not removed.

An intuitive and easy control of all parameters and the highly precise electronic regulation of the gas flow rate feature an unmatched repeatability and accuracy of the analytical results.

MASTER TD allows time saving sample overlapping increasing sample throughput and laboratory productivity: the next desorption can be started during the GC analysis of the previous sample.

The minimal sample handling and the complete automation of all process steps ensure highly reliable and reproducible results even with unskilled operators.



## MASTER Air Sampler

The MASTER Air Sampler is the ideal solution to execute unattended field or on-line monitoring. A programmed sample processing enables the Direct Sampling of ambient air, gas streams, sampling bags or canisters straight into the MASTERTD trap.

Three sampling lines for sample, blank, and calibration standards are available. Sample throughput can be enhanced by using the Line Selector option to process up to ten lines. Gas flow rates are MFC controlled to guarantee the maximum repeatability of the sampled volume.

The MASTER Air Sampler, controlled by the TD Manager software, can be programmed to perform an infinite number of analyses.

The system is compliant with the U.S. EPA methods for air sampling such as TO-14 and TO-15 for canister sampling.



## Green, Safe, and Cost-Effective Technique

Unlike other extraction techniques, there is no need for solvents, avoiding the possible masking of peaks of interest by the solvent peak and the introduction of impurities into the GC system.

In addition, the green technique prevents hazardous effects on the environment, protects the operators' health, and eliminates considerable solvent disposal and costs.

The sampling technique is based on the injection of gas vapors only, therefore ensuring a totally clean procedure, a long analytical column life-time, and highly reliable analytical results.

The tubes are reusable, thus, significantly reducing laboratory costs. Moreover, the use of an independent auxiliary gas line to desorb the sampling tube permits to use nitrogen, which is more cost-effective than helium.

## System Completeness

The MASTERTD simplicity permits the user to easily access the trap and handle the transfer line. Trap replacement is fast and easy requiring no intervention of the DANi service staff. In addition, the design includes the built-in conditioning; hence there is no need to acquire an external conditioning device.

The universal MASTERTD unit can be easily hyphenated to the MASTER GC and the MASTER TOF GC/MS as well as to the most common commercially available GC and GC/MS systems.

MASTER TD can be easily connected to any injector, without requiring hardware modification. Moreover, the transfer line can be simply connected leaving the injector free for direct syringe injection.

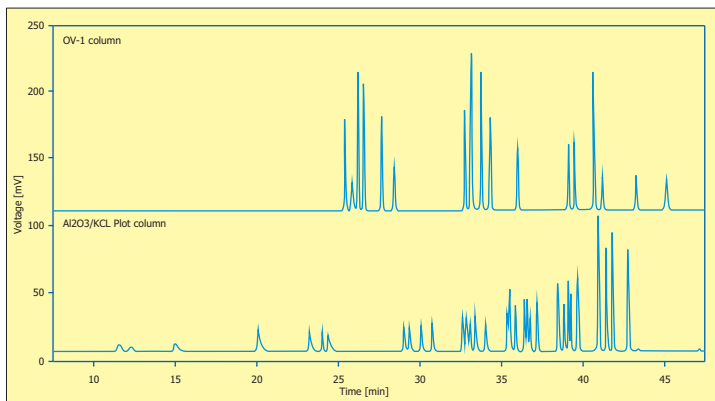
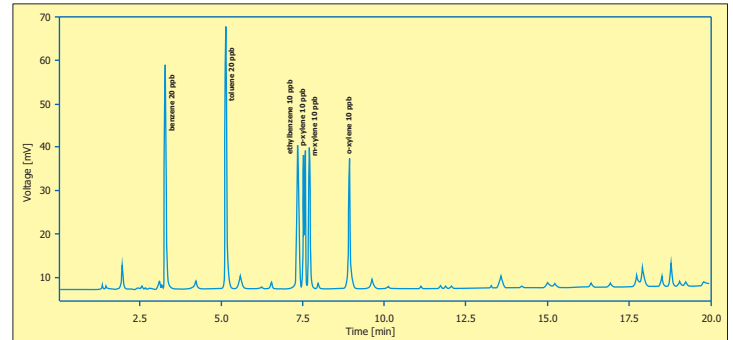
*For maximum completeness the MASTERTD unit can be hyphenated to the MASTER GC with MASTER AS Liquid Autosampler as well as the MASTER TOF Time of Flight GC/MS.*



## Unprecedented Sensitivity over a Wide Range of Applications

### Determination of Pollutants in Ambient Air

The environmental concentrations of BTEX in the ambient air of major cities worldwide are of great concern. Ambient air measurements can be efficiently carried out by the MASTER TD equipped with a trap that selectively retains the target volatiles. The system fulfils productivity requirements and achieves sensitivity at ppb levels meeting specifications given in established U.S. EPA and international methods.



### Monitoring of Ozone Precursors

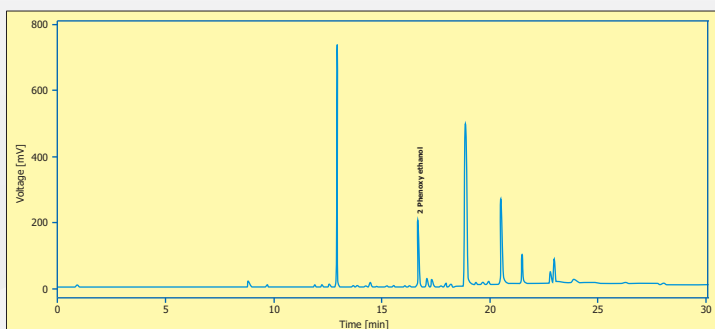
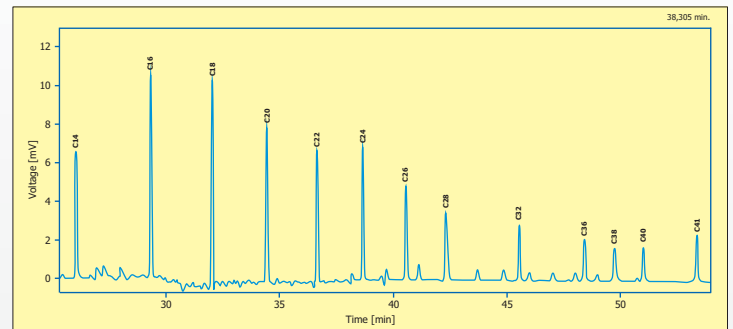
Ozone precursor monitoring turns out to be a daunting analytical challenge due to the low concentrations of atmospheric VOCs.

The MASTER Air Sampler connected to the MASTER TD permits the automated collection and enrichment of air sample analytes in multi-layer traps facilitating the extraction of 53 VOCs, ranging from ethene until naphthalene, using a multidimensional GC system equipped with different columns. The system features minimum detectable levels well below currently recommended limits (U.S. EPA Methods TO-14 and TO-15).

### Semi-volatile Organic Compounds Determination

In view of the importance of analyzing semi-volatile compounds, the MASTER TD hardware is designed to support optimized desorption gas flow and higher heating capacity, enabling the transfer of high boiling points compounds such as n-C<sub>44</sub> hydrocarbons.

The system satisfies the requirements of a wide array of routine and research applications such as agriculture, environmental protection, flavor and fragrance, plastics and polymers etc.



### Quantification of Glycol Ethers in Cosmetics and Toiletries (C&T) Products

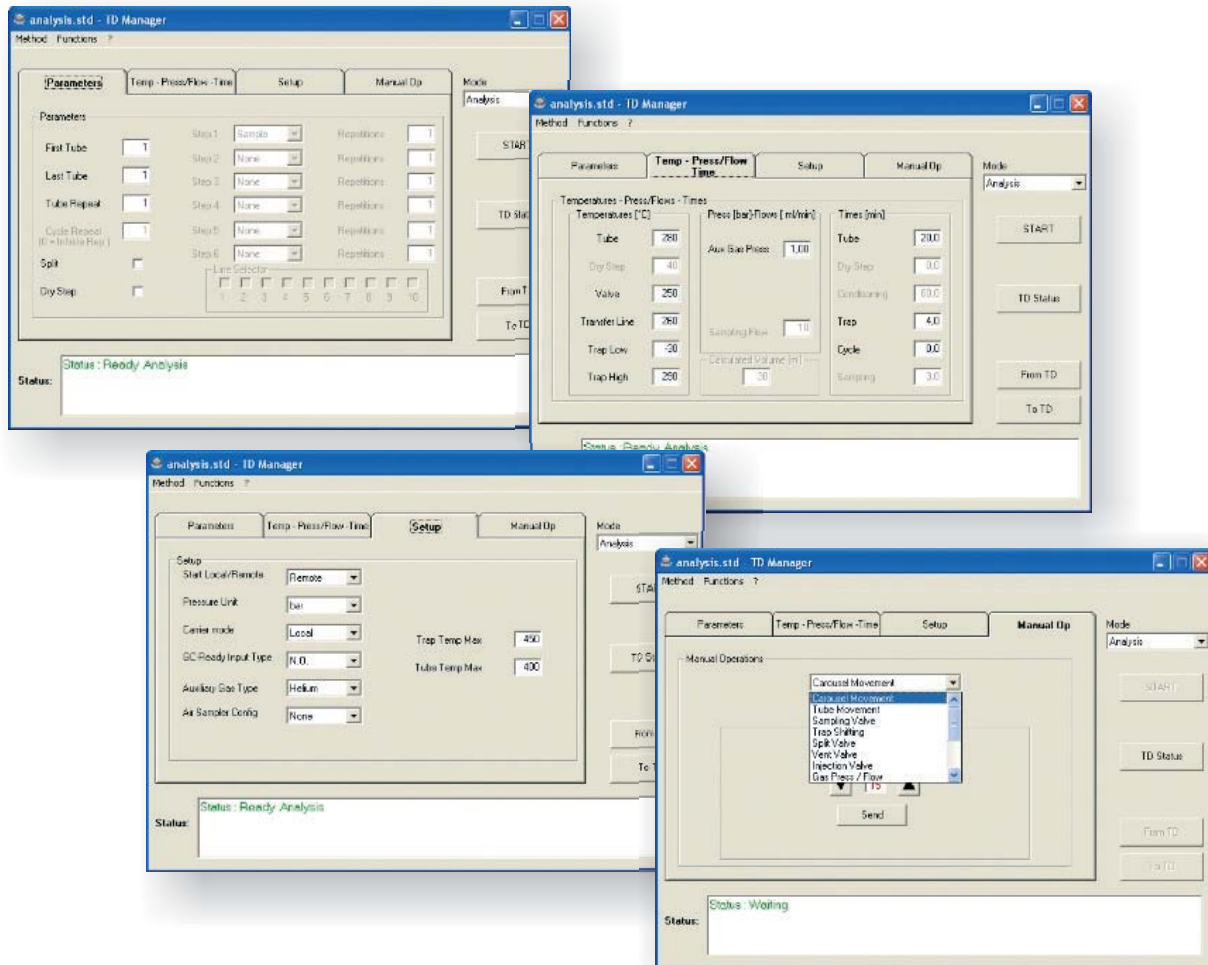
Glycol ethers are extensively used in C&T product formulations, even though overexposure is proven to be hazardous. Therefore quantification methods are to be addressed precisely.

The MASTER TD is an advantageous sampling tool which enables the direct access to solid samples located into the tube drastically reducing sample handling steps, while increasing sample throughput.

## Complete MASTER TD Control

The MASTERTD can be fully controlled by the standalone software TD Manager. The system control offers a straightforward method and sequence set up enabling automated analyses. Methods and sequences can be easily edited, stored, and uploaded to the instrument.

A remote communication between MASTER TD and MASTER GC enables high synchronization for safe and fast working cycles increasing laboratory productivity and profitability.



KEY TECHNICAL POINTS	
<b>MASTER TD</b>	<b>MASTER Air Sampler</b>
Built-in 50-position carousel	Three sampling lines for sample, calibration, and blank
Standard sized stainless steel, glass, and coated steel reusable tubes	Sampling rates from 10 to 100 mL/min
Compatible with Radiello® air sampling cartridges	Optional Line Selector to process up to 10 lines
High temperature oven, valve, and transfer line	Endless analysis can be send
Packed focusing trap with backflush desorption	Excellent repeatability
Several trap sorbent materials available	
Electrical trap cooling system	
Patented "Instant Desorption" Trap	
Inert sample flow path	
Compatibility with most of the commercially available GC and GC/MS systems	



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