

Thermal Desorption

Sample introduction systems for GC or GC/MS
in order to determine organic compounds in
gaseous and solid samples



For 35 years AMA Instruments has developed and manufactured analytical devices and accessories for trace level analysis of organic compounds by means of gas chromatography. The products are characterised by their analytical performance and reliability and are used world-wide for process and environmental monitoring applications as well as in modern laboratories.

AMA Instruments is one of the pioneers in the field of thermal desorption. This sample introduction technique for GC and GC/MS systems allows for analysis of organic compounds in gaseous and solid samples in a convenient manner. Advantages are ease of use, low efforts for sample preparation and superior detection limits.

Complementary to our thermal desorption instrumentation and our range of ancillary accessories we also provide technical expertise and application support along with a reliable spare parts service.



AIR TOXICS
SOLIDS
THERMAL DESORPTION
DRUGS
GAS CHROMATOGRAPHY
SOLVENTS
INDUSTRY
OCCUPATIONAL SAFETY
GASEOUS SAMPLES
ENVIRONMENT
FOOD
GC/MS
VOLATILES

Thermal Desorption Systems - Count on our expertise!

Thermal desorption has become a well established sample introduction technique for gas chromatography in order to determine volatile or semi-volatile organic compounds in air or gaseous samples and in solids.

In case of gaseous samples the organic compounds to be analyzed will be collected on suitable adsorbent materials prior to analysis, whereas solid samples can be analysed directly by means of thermal desorption.

Principle of Operation

The organic compounds are set free by rapidly heating the sample tube and are focussed subsequently in a cryo trap. After sample is introduced the analysis run will start automatically. Additional efforts for sample preparation, such as eluting the analytes using carbon bisulfide or other solvents, will no longer be required. Thus thermal desorption simplifies and speeds up a wide range of gas chromatography applications.



analytical



Maintaining sample integrity

Sample tubes used on AMA Thermal Desorbers are locked absolutely gastight using a septum in each sealing cap. Both septa will be punctured just before sample introduction. Thus any sample loss or contamination will be avoided. For this reason AMA Thermal Desorption Systems are ideally suited for trace level analysis or examination of critical samples.

Efficient peak separation

For high-resolution chromatography rapid release of the analytes during thermal desorption becomes essential. For this reason AMA Thermal Desorbers utilize metallic sample tube sleeves and focussing capillaries, which will be contacted directly and rapidly heated up using extremely high currents. Thus the sample tube sleeves and focussing capillaries serve as the heating element.

This results in unsurpassed heat transfer and heating-up rates during sample introduction, providing uncompromised peak separation efficiency.

Versatility for a wide range of applications

On AMA Thermal Desorbers all temperatures for flushing, desorption and focussing are freely programmable. This allows selective sample introduction.

In addition various focussing traps for retention of organic compounds with different boiling ranges are available and can be exchanged easily. Thus AMA Thermal Desorption Systems are unmatched in versatility and can be used for a wide range of steadily changing applications.

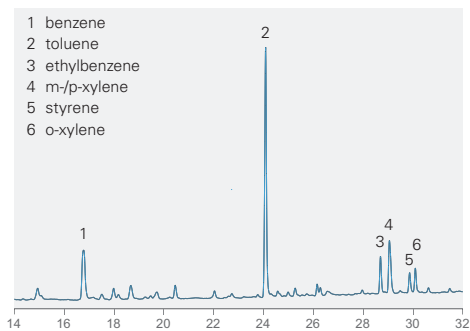
Challenging demanding applications

Both humidity and oxygen are automatically removed by a flushing cycle prior to thermal desorption of the sample. This preserves the analytical column, avoids any freezing of the focussing capillary and above all prevents the decomposition of sensitive compounds while heating up the sample. Additionally the short, heated narrow-bore line without any valve installed in the flow-path allows even easily decomposable or sticky and high boiling organic compounds to be transferred and avoids any sample loss or carryover. Especially for highly demanding applications therefore AMA Thermal Desorbers are always the first choice.



Due to the compact design of the AMA Thermal Desorption Unit the system can be interfaced easily to almost any GC or GC/MS system with vertical injection.

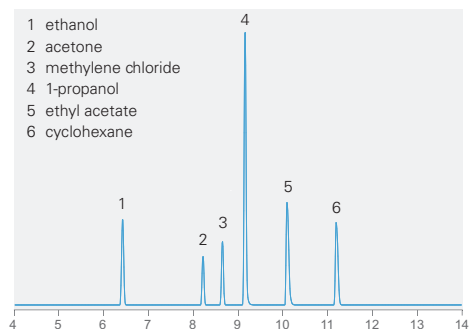
Applications for AMA Thermal Desorbers



Air and gas monitoring

Thermal desorption is ideally suited for determination of air toxics and other volatile organic compounds, such as solvents or ozone precursors, e.g. for occupational health and safety monitoring and for process control or pollution monitoring.

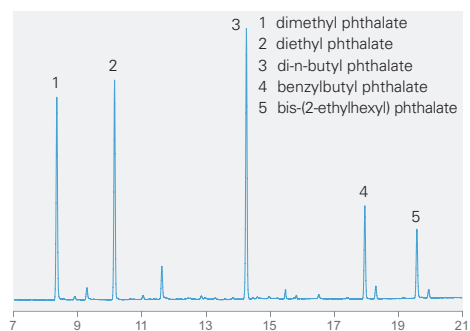
A typical example shows the monitoring of benzene, toluene and xylene in air. These components are particularly injurious to human health due to their toxicity and their carcinogenic nature.



Analysis of solid samples

Solids can easily be analyzed by applying thermal desorption. For determination of organic compounds the sample is simply filled into a sample tube. No additional sample preparation will be required.

The chromatogram shows an application from the pharmaceutical industry. For production control and QA/QC purposes the concentration of solvent residues in tablets can easily be determined by means of thermal desorption.



Test chamber and stripping methods

Evaporations e.g. from foams, adhesives, floor coverings, elastomers, plastics or molding materials can be determined by the use of test chamber methods. At well defined conditions an aliquot air sample will be taken from the chamber for subsequent analysis by means of thermal desorption.

The example chromatogram shows the examination of evaporated plasticizers from polymers in a test chamber.

Stripping methods work in a similar way. The volatile organic compounds will be stripped out using a carrier gas and collected on a sample tube for subsequent thermal desorption and GC analysis.

Accessories for AMA Thermal Desorbers

Complementary to the Thermal Desorption Systems for GC and GC/MS AMA Instruments offers a broad range of ancillary accessories for air and gas sampling as well as sample preparation.

Sampling Units

Portable sampling units and automated air sampling devices of AMA Instruments are used to take an exactly defined air volume referenced to standard operating conditions. All devices allow for volume or time-based programming in the field and can be either line or battery powered.



Adsorbents- and Sample Tubes

For indoor and outdoor air monitoring applications, e.g. in conjunction with occupational health and safety monitoring, sample tubes with various adsorbents for all kind of applications and differing boiling ranges are available. These tubes meet the requirements of thermal desorption standard methods according to VDI, DIN, EN, ISO and US-EPA directives.



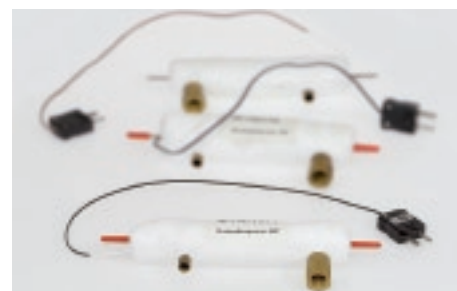
Sample Sleeves and Septa

AMA Thermal Desorption Systems use special sample sleeves made of stainless steel, which are also used as the heating element. The adsorbent or sample tubes will be inserted into these sample sleeves and locked absolutely gastight with a septum in each sealing cap. This protects the sample tubes during transportation. Any sample loss or contamination of the sample will be avoided thus maintaining the integrity of both cleaned and sampled adsorbent tubes.

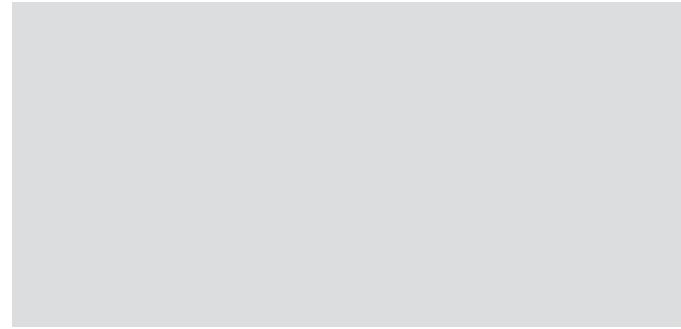


Focussing capillaries

Depending on polarity, boiling range or other properties of the compounds to be determined various focussing capillaries are available. This allows our customers to configure the AMA Thermal Desorbers for analysis of low boiling organic components from C₂ as well as analysis of sticky and high boiling or easily decomposable organic compounds in order to cover a wide range of different applications.



Your sales contact:



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