

For Mass Spectrometry and Chromatography

FEATURES

Vacuum Pump Exhaust Filters
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The first of three articles reporting on the effectiveness of filters designed for use on the exhaust of vacuum pumps.

Replacing a DeTech Electron Multiplier in the Agilent 5973 MSD
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Replacing an electron multiplier can be successfully accomplished in just 15 minutes after the instrument is cooled down to the touch. All that is required are a pair of clean room gloves and the DeTech Model 2300 Electron Multiplier.

NEW - SIS Monthly E-mail Newsletter!

Beginning in July, SIS will be distributing a monthly e-mail newsletter on SIS products, services, promotions, news and other mass spectrometer related information. To receive this free newsletter fill in the attached form (pg.15) with your e-mail address and return it to SIS by mail or drop it off at the ASMS meeting.

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**The Tradition
 Continues at ASMS**



Once again SIS will be attending the annual ASMS meeting in Long Beach California on June 12 - 15. SIS will be providing our traditional ice cream treats in our ASMS suite. The SIS hospitality suite hours will be Monday through Wednesday from 7:30 - 10:30 pm. Stop by and receive our free 10-in one screwdriver after filling out the attached survey form (See page 15). We have invited three other companies to share our suite. These include **DeTech**, the fastest growing manufacturer of mass spectrometer detectors, **Prolab Resources**, a service company and manufacturer of replacement data systems, and **Mass Sensors**, a manufacturer of small mass spectrometers for process analytical and educational uses. In addition SIS will be sponsoring lunchtime presentations at our hospitality suite. (See next page.)

SIS Posters at ASMS

1. Controlling Laboratory Air Contamination from Rotary Vacuum Pumps by Using a Two-Stage Vacuum Pump Exhaust System.
 by *John Manura* - **Poster # 1270**
2. Analysis of Silicone Contaminants on Electronic Components by Thermal Desorption GC-MS.
 by *Eric Butrym* - **Poster # 1425**

SIS Topical Seminars at ASMS

SIS is sponsoring three introductory seminars at this year's ASMS conference. Each presentation is designed as an introduction to the selected topic. These walk-in sessions will be held from 12:15 - 1:00 on each day in our hospitality suite, Hyatt Seaview C (first floor).

Monday Lunch

Applications of Thermal Desorption - Volatile and Semi-Volatile Analysis in Air

by Stuart Batterman, University of Michigan

Air sampling using sorbents, thermal desorption, and gas chromatography is a versatile method for identifying and quantifying trace levels of volatile organic compounds (VOCs). Points to be discussed include the appropriate choices of sorbents and method parameters in order to accommodate a wide range of compounds and high humidity. The advantages of an automated short-path system for minimizing artifacts, losses, and carry-over effects are illustrated. As examples, results will be presented that demonstrate the performance of a thermal desorption method for 77 VOCs using laboratory and field tests and a dual sorbent system (Tenax GR, Carbosieve SIII). Laboratory tests showed that the method requirements for ambient air sampling were easily achieved for most compounds, e.g., using the average and standard deviation across target compounds, blank emissions were ≤ 0.3 ng/sorbent tube for all target compounds except benzene, toluene and phenol; the method detection limit was 0.05 ± 0.08 ppb, reproducibility was $12 \pm 6\%$, linearity as the relative standard deviation of relative response factors was $16 \pm 9\%$, desorption efficiency was $99 \pm 28\%$, samples stored for 1 to 6 weeks had recoveries of $86 \pm 9\%$, and high humidity samples had recoveries of $102 \pm 11\%$. Due to sorbent, column and MSD characteristics, performance was somewhat poorer for phenol groups, ketones, and nitrogen containing compounds. The laboratory results were confirmed in an analysis of replicate samples collected in two field studies that sampled ambient air along roadways and indoor air in a large office building. Replicates collected under field conditions demonstrated good agreement except at very low concentrations or for large (> 4 l volume) samples of high humidity air. Overall, the method provides excellent performance and satisfactory throughput for many applications.

Tuesday Lunch

How AMDIS Could Have Saved My Sister's Marriage by O. David Sparkman

AMDIS attempts to reconstruct original mass spectra for individual components in arbitrarily complex GC/MS and LC/MS reconstructed total ion current (RTIC) chromatograms and, if a target library is provided, AMDIS can directly identify target compounds. AMDIS is especially useful when an RTIC chromatographic peak represents multiple components. Regardless of each component's concentration, pure mass spectra are deconvoluted for analysis.

AMDIS has been designed to reconstruct "pure component" spectra from complex RTIC chromatograms even when components are present at trace levels. For this purpose, observed chromatographic behavior is used along with a range of noise-reduction methods. AMDIS is distributed with specialized libraries (environmental, flavor and fragrance, and drugs and toxins), that were derived from the NIST98 Library. AMDIS has a range of other features, including the ability to search the entire NIST98 Library with any of the spectra extracted from the original data file. It can also employ retention index windows when identifying target compounds and can make use of internal and external standards maintained in separate libraries. A history list of selected performance standards is also maintained.

Wednesday Lunch

LC/MS Fundamentals and Applications

by Mike Lee, Milestone Development Services

Abstract: The combination of high-performance liquid chromatography and mass spectrometry (LC/MS) has had a significant impact on industrial applications over the past decade. Continual improvements in LC/MS interface technologies combined with powerful features for structure analysis, qualitative and quantitative, have resulted in a widened scope of application. An iterative cycle of "what is it?" and "how much is there?" continues to fuel the tremendous growth of LC/MS. This talk will review the fundamentals of LC/MS and provide perspective on strategies for method development. Current applications of LC/MS technologies and emerging industry trends will also be discussed.

Terms and Conditions

Scientific Instrument Services (S.I.S.) continues to supply "The Mass Spec Source" newsletter as a service to our customers. Printed four times a year, it includes articles and notes on new products and procedures of interest to mass spec and GC users. Papers from all fields of scientific inquiry in which mass spectrometry and gas chromatography can play a role will be considered and subject to review. However, S.I.S. reserves the right to reject any article that is in direct competition with S.I.S. products.

Articles and Application Notes

Editorials and reviews on new instrumentation and techniques for GC/MS will be considered for publication. These articles may be any length and our Graphics Department will aid you in any way you may need.

Mass Spec Tips

Any new ideas or tips that could benefit other mass spectroscopists can be submitted for inclusion in this section.

For More Information

Anyone interested in writing in any of the areas above should contact the editor of the Mass Spec Source, at (908) 788-5550. We are always trying to improve this newsletter, if you have any suggestions please give us a call. Thanks for your continued support.

Warranty

S.I.S. does not warranty that the items described herein are usable or fit for a particular purpose. Our company makes no representation as to condition or character of the merchandise. S.I.S. will not be responsible for consequential or special damages.

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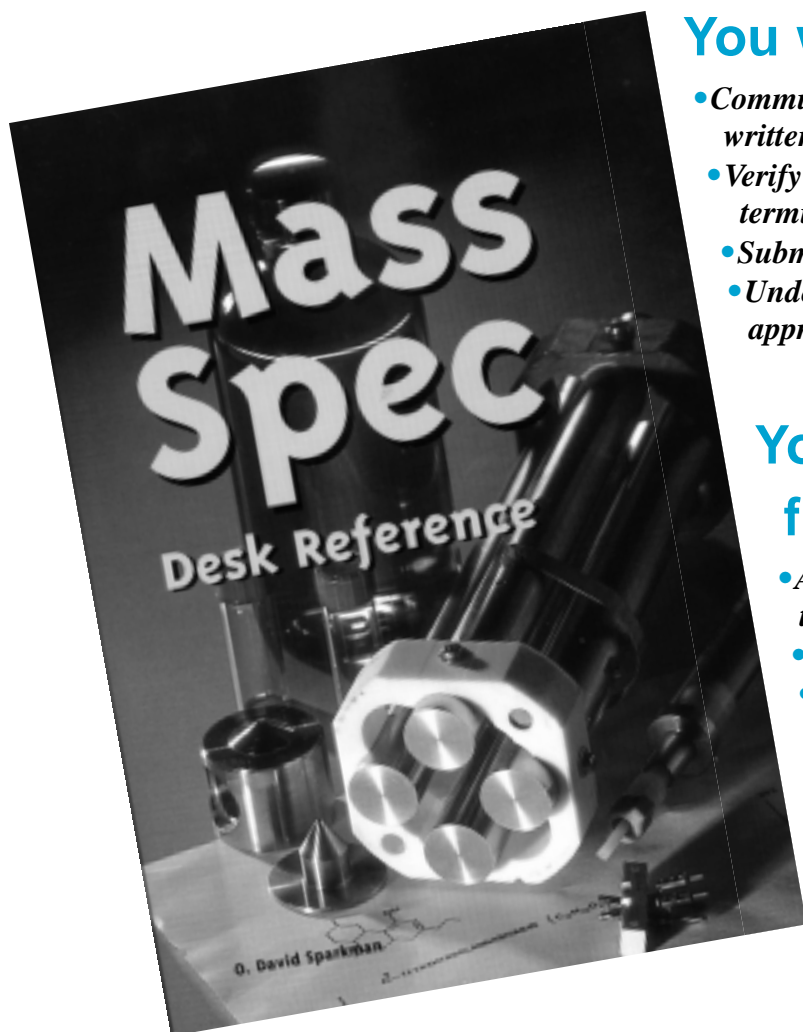
Web: <http://www.sisweb.com>, E-mail: <http://www.sisweb.com/contact>

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Mass Spec Desk Reference

by O. David Sparkman

The Mass Spec Survival Guide



You will be able to:

- *Communicate more effectively through written and oral presentations*
- *Verify that you are utilizing the correct terminologies*
- *Submit higher quality proposals*
- *Understand and utilize the appropriate formats and conventions*

You will have at your fingertips:

- *A complete list of correct and incorrect terminology*
- *Important formulas and equations*
- *A thorough overview of modern instrumentation and techniques*
- *A comprehensive bibliography of mass spectral publications*
- *Where to find information on any topic in mass spectrometry*

Whether you are a newcomer, teacher, manager, or experienced practitioner engaged in mass spectrometry, you will find this handy desk reference and invaluable tool for improving your results.



Part No.	Description	Price
0-9660813-2-3	Mass Spec Desk Reference	\$29.95

Vacuum Pump Exhaust Filters

Part I – A Two Stage Vacuum Pump Exhaust Filter System

By John J. Manura, Scientific Instrument Services, Inc., 1027 Old York Road, Ringoes, NJ 08551

INTRODUCTION

The quality of indoor air is affected by many factors including construction materials, heating and ventilation systems and emissions of volatile organic compounds (VOC's) from building furnishings, equipment, and maintenance supplies. In the laboratory, chemicals and instrumentation are additional contributors to the contamination of the indoor air. Vacuum pumps are widely used for mass spectrometers, electron microscopes, lyophilizers, and other vacuum equipment. These pumps can be a major source of indoor air contamination. It is normally recommended that these vacuum pumps be vented outside the room or to a laboratory exhaust hood. However this is not always practical when the instrumentation is located within the interior of a building.

Indoor air contamination by vacuum pumps originates from the lubricating oils used in the pumps, and also from chemicals that have contaminated the pump oil. When the vacuum pumps are first turned on, a large volume of air is pumped through the pump oil which causes a fine mist of oil fumes to be emitted from the pump exhaust and into the laboratory air. When the vacuum pumps are used in instruments such as mass spectrometers, all the residual organic chemicals analyzed by the mass spectrometer are trapped in the vacuum pump oil. Eventually these organics are purged out of the oil and into the laboratory air via the vacuum pump exhaust. Often the organic chemicals analyzed by these vacuum system instruments can be quite toxic or carcinogenic. This can present a serious environmental health problem in the laboratory.



This is the first of three articles reporting on the effectiveness of filters designed for use on the exhaust ports of vacuum pumps (1, 2 & 3). This first article demonstrates the effectiveness of a two stage vacuum pump filtering system. The first stage filter consists of an oil mist eliminator to trap the heavy oils from the pump oil mist and return them to the vacuum pump. The second stage is a charcoal trap for the containment of volatile organics in the vacuum

pump exhaust. The second article in this series (2) describes the design of the oil mist eliminator and includes additional studies of the effectiveness of the oil mist eliminator. The third article in this series (3) describes the efficiency of the charcoal trap in greater detail. The combination of the two vacuum pump exhaust filters described in this article can provide for efficient and safe trapping of emissions from laboratory vacuum pumps and can improve the quality of air in the instrumentation laboratory.

EXPERIMENTAL

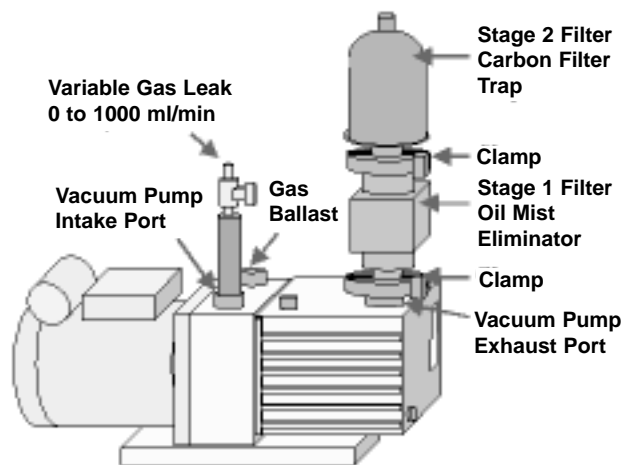


Figure # 1 – Vacuum Pump Exhaust Filtering System Mounted on a Vacuum Pump.

The two stage vacuum pump exhaust filtering system is shown above (Figure # 1). The two filters attach in series to the exhaust port of a vacuum pump. For these studies, an Alcatel oil mist eliminator was used (Scientific Instrument Services part # 66827) as the stage 1 filter. An NW25 vacuum pump exhaust fitting was first attached to the exhaust port of the vacuum pump, and the Oil Mist Eliminator was clamped to this fitting using a centering ring and clamp. The Stage 2 charcoal trap used for this study is the Koby charcoal exhaust filter (Scientific Instrument Services Part # KA-1), which is fitted with an adaptor to mate it to the NW fitting on top of the oil mist eliminator. The two filters are clamped together using a centering ring and clamp.

All studies were performed on a BOC Edwards model E2M1.5 rotary vacuum pump, which is the standard model used on the Agilent mass spectrometers. The old oil in the pump was drained and the pump was charged with a volume of Inland 45 pump oil (Scientific Instrument Services). Inland 45 pump oil is the vacuum pump oil of choice because it is a highly refined oil

comprised of aliphatic hydrocarbons with chain lengths of between 20 and 40 carbon units. The pump was run for two hours and the oil drained. The pump was again filled with a full charge of Inland 45 pump oil and run for 2 hours with the gas ballast valve open and then for an additional 2 hours with the gas ballast valve closed before any testing was done. This cleaning and flushing procedure assured that the pump was free of contaminants from the previous use of the vacuum pump. For this study a micro-needle valve was attached to the intake port of the vacuum pump to permit a calibrated flow of air into the vacuum pump. The flow through the needle valve was adjusted to 100 ml/min (or 300 ml/min for some studies) and calibrated with a Gilibrator Air Flow Calibration System (Scientific Instrument Services Part # 800844-2).

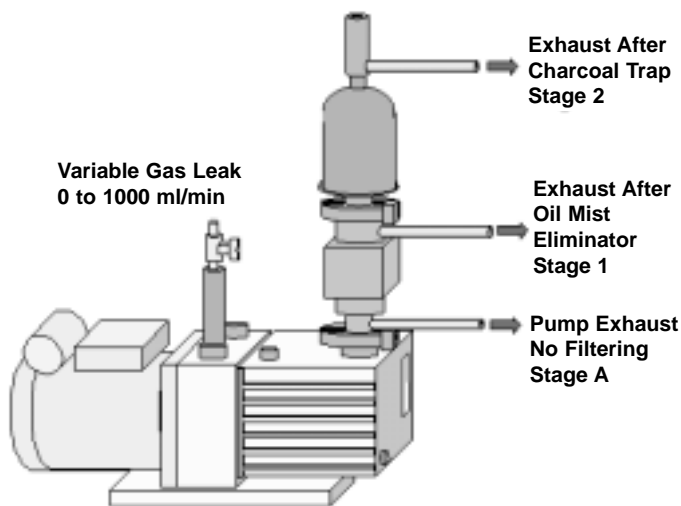


Figure # 2 – Analysis of Vacuum Pump Exhaust in the Two Stage Exhaust Filtering System

For these studies, air samples were collected at three levels in the exhaust stream from the vacuum pump (Figure # 2). The first level (Stage A) is directly from the pump exhaust with no filtering. Another air sample was collected after the oil mist eliminator (Stage 1) and the final air samples were collected after the charcoal trap (Stage 2) and right before the exhaust air would enter the laboratory air.

Thermal Desorption tubes were packed with 100 mg of Tenax TA and flow conditioned with pure nitrogen at 50 ml/min at 300°C for 3 hours. Air samples were collected from the three pump stages onto the Tenax adsorbent traps at a collection rate of 25 ml/min for 20 minutes (500 ml total) using a Gilian LFS-113 Air Sampling Pump (Scientific Instrument Services). The collected samples were analyzed using the SIS Automated Short Path Thermal Desorption System (AutoDesorb Model 2000, Scientific Instrument Services), which is described in previous articles (4) and shown below (Figure # 3). The desorption tubes were attached to the AutoDesorb system and first purged with 30 ml of helium. The desorption tubes were then desorbed from 100 to 250°C at a rate of 60° per minute and held at 250° for a total desorption time of 6 minutes. The desorbed analytes were trapped on a GC Cryo-Trap (Scientific Instrument Services), which was pre-cooled to -65°C using liquid CO₂.

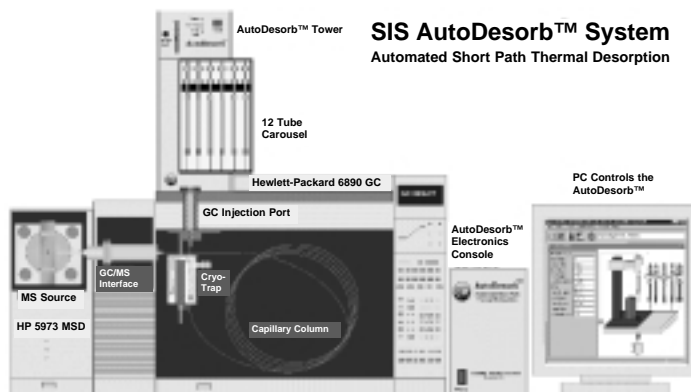


Figure # 3 – Schematic of the SIS AutoDesorb System on a GC/MS System

The AutoDesorb system was attached to an Agilent Technologies 6890 GC for the separation of the analytes and the Agilent 5973 MSD to detect and identify the analytes. The GC column for these studies was an Agilent DB5-MS, 0.25 µ film thickness, x 0.25 mm I.D. x 30 meters long. A 6" long DB-5, 1.5 µ film thickness x 0.53 mm I.D. guard column was used at the front of the GC column and inside the Cryo-Trap. When the desorption was complete, the Cryo-Trap was rapidly heated to 250°C. The GC column was held at 40°C for 5 minutes and then temperature programmed to 280°C at 10° per minute. The total GC run time was 29 minutes. The Agilent MSD was operated in the EI mode and scanned from 35 to 450 daltons.

For the studies of the ability of the filters to trap volatiles, 10 µl of gasoline was injected directly into the vacuum pump. Gasoline was selected because it contains a wide range of volatile and semi-volatile organics and would accurately simulate the wide range of chemicals that might be injected into a mass spectrometer.

DISCUSSION

Oil Mist Eliminator

Oil mist eliminators are designed to trap the heavy oil vapors or mists which escape from the vacuum pump during initial pump down, during extended operation or when using the gas ballast valve to purge or outgas the vacuum pump oil. The oil mist eliminator contains a replaceable paper cartridge inside the filter housing. The paper wick exposes the oil mist to a large surface area to adsorb the oil vapor and return it to the vacuum pump. When a vacuum pump is first turned on, this oil mist is easily seen as a fine mist, which enters the laboratory environment. See the second article in this series for a more thorough description of the oil mist eliminator (2).

The effectiveness of the oil mist eliminator is demonstrated in Figure # 4. For this study, the purge leak valve on the vacuum pump inlet was opened and the leak flow was adjusted to 300 ml/minute. At the vacuum pump exhaust port (stage A) of the pump, a high concentration of high molecular weight hydrocarbons is exhausted from the pump as shown in the top total ion

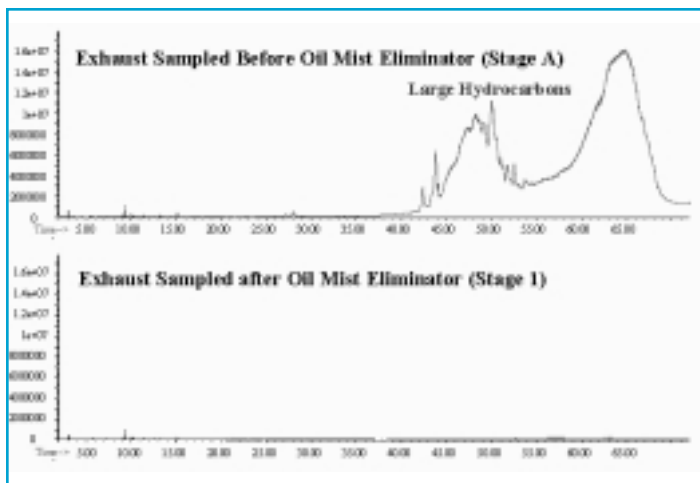


Figure #4 – Efficiency of the Oil Mist Eliminator at Removing Hydrocarbons

chromatogram in Figure # 4. A large number of straight and branched hydrocarbons were detected with carbon chains over 20 carbons in length. The bottom total ion chromatogram in Figure # 4 shows the air sampled after the oil mist eliminator. When the oil mist eliminator is used these high molecular weight organics are trapped by the filter and returned to the pump. They do not exhaust out of the oil mist eliminator and are not present in the chromatogram. This study demonstrates that the oil mist eliminators are quite effective at performing the job for which they have been designed, that is trapping the high molecular weight vacuum pump oils and returning them to the vacuum pump.

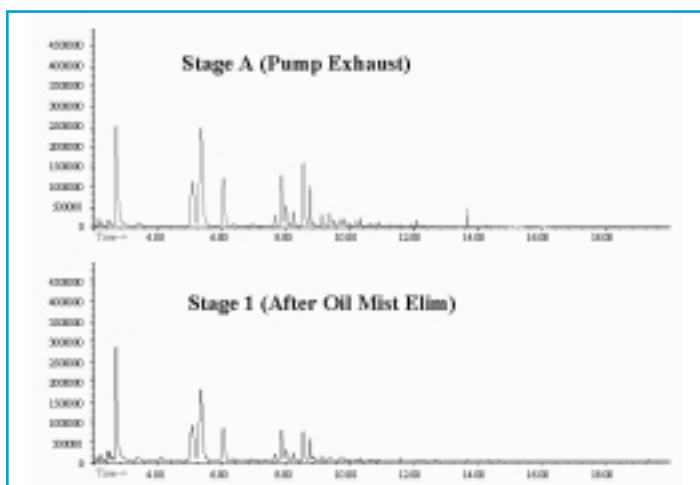


Figure #5 – Trapping Efficiency of Filter Stages (1.0µl of gasoline injected into pump)

However, the oil mist eliminators with their paper filters are not effective at trapping the lighter hydrocarbons and organics in the vacuum pump exhaust as shown in the chromatograms of the second study (Figure # 5). In this study 1.0 ul of gasoline was injected directly into the vacuum pump and the exhaust air subsequently collected at the exhaust port of the vacuum pump and after the oil mist eliminator and analyzed as described above. The exhaust at the top of the vacuum pump (top chromatogram - Stage A), as well as the exhaust after the oil mist eliminator (second

chromatogram - Stage 1), exhibit high concentrations of the volatile aromatics and hydrocarbons from the gasoline.

Additional studies described in the second article of this series (2), demonstrates that these volatiles are not purged out of the vacuum pump oil very quickly, but are in fact purged out over many hours or days of continuous pumping. Therefore venting the vacuum pumps for a short period of time when hazardous materials are analyzed will not be effective in preventing these materials from entering the laboratory environment. The vacuum pumps must be externally vented continuously or a better system such as the addition of a charcoal trap is needed to trap these more volatile organics.

Charcoal Traps

Charcoal traps are ideally suited for the trapping of volatile and semi-volatile organics in air. The Koby charcoal trap used for this study has been designed for the trapping of volatile and semi-volatile organics from the vacuum pump exhausts. Each trap contains about 100 grams of carbon with a surface area of about 1500 sq. meters per gram. This high surface area provides for very efficient air purification. These charcoal filters have a high adsorption capacity and affinity for adsorbing organic contaminants. Further testing described in the third article of this series (3), demonstrated that each charcoal trap could be saturated with 70 ml of gasoline with no volatile emissions being eluted from the filter. In addition to trapping volatile and semi-volatile organics, these charcoal traps will adsorb water, oil mist dirt (to 0.5 microns) and bacteria (to 0.5 microns). The Koby charcoal traps produce minimal back-pressure to the vacuum pump, and can therefore operate safely on the exhaust port of the vacuum pump.

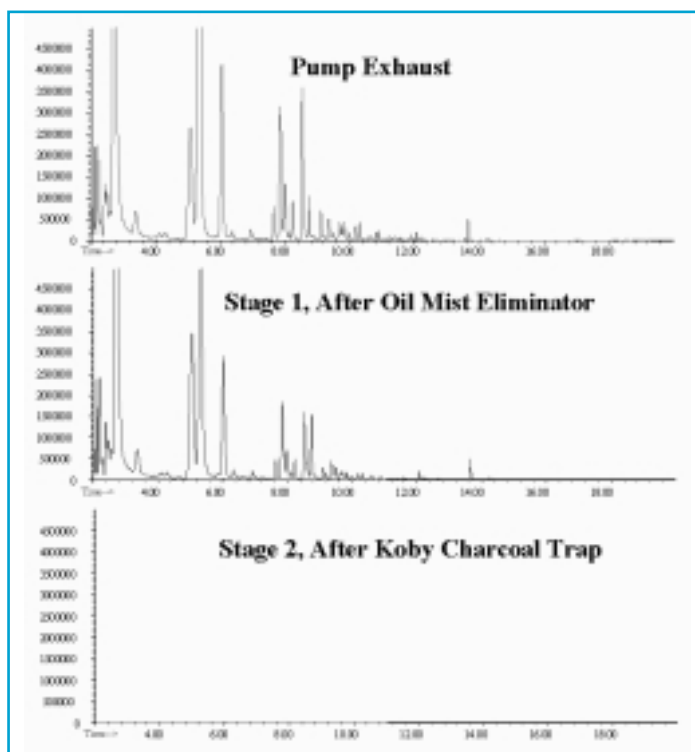


Figure #6 – Trapping Efficiency of Two Filter Stages (1.0µl of gasoline injected into pump)

In the next study, 10 ul of gasoline was injected directly into the vacuum pump and the exhaust air from all three locations or stages of the pump filters was collected and analyzed as described above (Figure # 6). At the exhaust directly from the vacuum pump (top chromatogram - stage A) as well as the exhaust after the oil mist eliminator (middle chromatogram - Stage 1), high concentrations of the aromatics and hydrocarbons from the gasoline were detected. However the charcoal trap was extremely efficient at removing all the volatile organics from the vacuum pump exhaust. The exhaust from the top of the charcoal trap (bottom chromatogram – Stage 2) contained no peaks of any volatile or semi-volatile organics. As shown above none of the light hydrocarbons including hexane and pentane were evident in the charcoal trap exhaust, nor was acetone or any of the aromatics common in gasoline present in the charcoal trap exhaust.

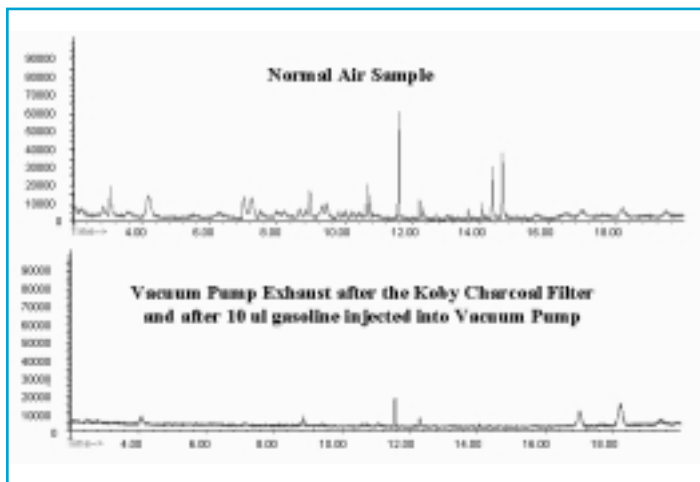


Figure #7 – Vacuum Pump Exhaust After the Koby Air Filter

An additional study (Figure # 7) demonstrates that the air exhausted by the vacuum pump through the Koby charcoal traps was cleaner than the normal indoor air in our testing facilities. Note that the results shown in this graph are shown at 50X scale expansion from the data shown in Figure # 5 previously. The small peaks shown in the graph are not from the gasoline, but are siloxanes from the GC septum.

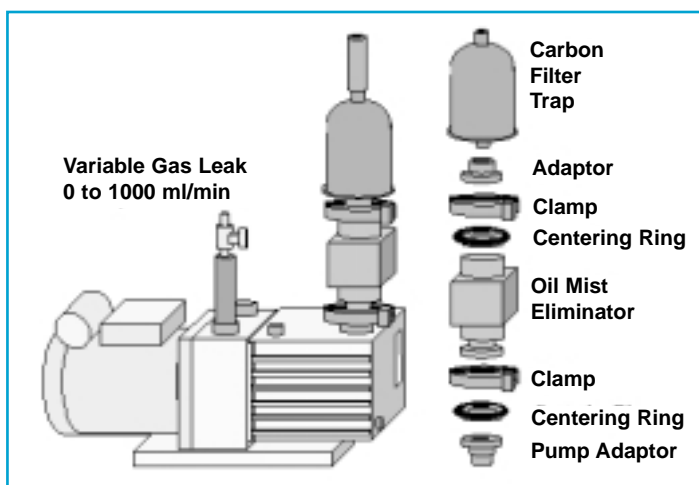


Figure #8 – Assembly of the Two Stage Vacuum Pump Exhaust Filtering System

ASSEMBLY OF SYSTEM

The combination of the two exhaust filters are joined together, and to the vacuum pump, using standard NW (or QF) vacuum type connectors. If the vacuum pump exhaust port is not equipped with an NW type fitting (either NW10, 16 or 25), then the appropriate adaptor for the pump must be first installed. The oil mist eliminator is then attached to this fitting using a centering ring and ‘O’ ring using a quick clamp. The Koby filter comes with 1/2" NPT male fittings on both ends of the trap. Therefore a NW flange to 1/2" female adaptor must be first attached to the Koby filter before it is attached to the top of the oil mist eliminator using another centering ring and quick clamp. The oil mist eliminators, Koby charcoal traps as well as all the fittings necessary for the assembly of the dual exhaust filter system are available from Scientific Instrument Services (5). In addition complete kits for the common pumps are also available (5).

CONCLUSION

This is Part I of a three part series of articles on the effectiveness of the vacuum pump exhaust traps. Part I describes the two stage vacuum pump exhaust filter system for the complete treatment of vacuum pump exhaust (1). Part II describes the operation and the effectiveness of the oil mist eliminator (2). Part III of this series describes the charcoal trap and its effectiveness at removing volatiles and semi-volatiles from vacuum pump exhaust (3)

The Two Stage Vacuum Pump Exhaust Filter System has been shown to be an effective system for removing volatile and semi-volatile organics from the exhaust of vacuum pumps and can help maintain an environmentally safe atmosphere in the instrumentation laboratory. The oil mist eliminator (Stage 1) has been shown to effectively trap the high molecular weight hydrocarbons from the pump oil and return these oils back into the vacuum pump. The charcoal trap (Stage 2) adsorbs and traps the volatile and semi-volatile organics from the pump exhaust and prevents these organics from entering the laboratory environment. It is recommended that both filters be used. The oil mist eliminator traps the large volume of heavy oils which would otherwise quickly saturate the charcoal trap during initial pump down or when using the gas ballast valve to purge the pump oil. When both filters are used in series on a vacuum pump exhaust port, the exhaust from the final stage of filtering has been shown to be cleaner than the normal laboratory air.

References

- (1) Vacuum Pump Exhaust Filters, Part I – Two Stage Vacuum Pump Exhaust Filter System, by John J. Manura, April 2000, SIS Application Note # 82 <http://www.sisweb.com/referenc/applnote/app-82.htm>
- (2) Vacuum Pump Exhaust Filters, Part II – Oil Mist Eliminators, by John J. Manura, April 2000, SIS Application Note # 83 <http://www.sisweb.com/referenc/applnote/app-83.htm>
- (3) Vacuum Pump Exhaust Filters, Part III – Charcoal Exhaust Traps, by John J. Manura, April 2000, SIS Application Note # 84 <http://www.sisweb.com/referenc/applnote/app-84.htm>
- (4) Design, Development and Testing of a Microprocessor Controlled Automated Short Path Thermal Desorption Apparatus, by John J. Manura, Vinod T. Das, Christopher Baker, Daniel Lieske, John C. Miller, John Manos, Roland Roadenbaugh, Thomas G. Hartman, SIS Application Note # 80 <http://www.sisweb.com/referenc/applnote/app-80.htm>
- (5) Two Stage Vacuum Pump Exhaust Filter Systems, Scientific Instrument Services, 1027 Old York Road, Ringoes, NJ 08551, Phone: (908) 788-5550 <http://www.sisweb.com/vacuum/sis/exfilter.htm>

COMPLETE TWO-STAGE VACUUM PUMP EXHAUST FILTER KITS

Features

Two Stage Vacuum Pump Exhaust System

- Purifies Vacuum Pump Exhaust Gases
- Provides for a Safe Laboratory Environment

Stage 1 - Oil Mist Eliminator

- Eliminates Pump Oil Fumes
- Returns Used Oil to Vacuum Pump

Stage 2 - Charcoal Filter

- Traps Organic Chemicals
- Traps Particles & Bacteria to 0.5 microns



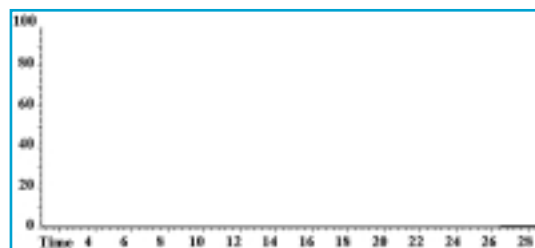
Charcoal Trap

The charcoal trap (Stage 2) adsorbs and traps the volatile and semi-volatile organics from the pump exhaust and prevents these organics from entering the laboratory environment. Each trap contains about 50 grams of carbon with a surface area of about 1500 sq. meters per gram and has a high adsorption capacity for adsorbing organic contaminants. The charcoal traps also adsorb water, oil mist dirt and bacteria (to 0.5 microns).

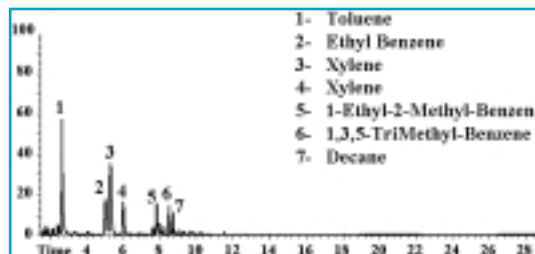


Oil Mist Eliminator

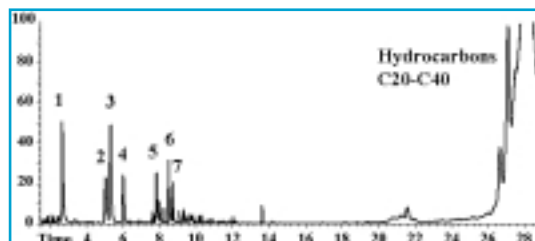
During initial pump down or when using the gas ballast valve, oil vapors exhaust from the vacuum pump. The oil mist eliminator (Stage 1) traps the hydrocarbons in this exhaust. The paper wick inside the oil mist eliminator exposes the oil mist to a large surface area to adsorb the oil vapor and return it to the vacuum pump.



Pump Exhaust after Charcoal Trap



Pump Exhaust after Oil Mist Eliminator



Pump Exhaust with No Filtering

COMPLETE TWO-STAGE VACUUM PUMP EXHAUST FILTER KITS

Alcatel Pump Filter Kit

For all Models of Alcatel Vacuum Pumps with NW25 flange.



Alcatel Vacuum Pump Kit (Kit FK101) contains the Alcatel Oil Mist Eliminator, Koby Filter and the fittings shown below. This kit is all you need to install the complete two stage exhaust filter to your Alcatel vacuum pump. It can also be used with any other manufacturers pumps that have an NW25 flange type fitting on the exhaust port.

Part No.	Description	Price
FK101	Alcatel Pump Filter Kit	\$223.20

Kit Part # FK101



Edwards Large Filter Kit

For Edwards Models E1M5/8, E2M3/5/8 and RV3/5/8 pumps



The Pump Filter Kit for the Edwards Pump includes the Edwards EMF10 Oil Mist Eliminator, Koby Charcoal Trap and all fittings needed to attach this two filter system on the larger Edwards vacuum pumps. This kit is to be used with Edwards models E1M5/8, E2M2/3/5/8 and the RV3/5/8 vacuum pumps. It can also be used with any other manufacturers pumps that have an NW25 flange type fitting on the exhaust port.

Part No.	Description	Price
FK201	Edwards Large Filter Kit	\$234.70

Kit Part # FK201



Edwards Small Filter Kit

For Edwards Models E2M0.7, E2M1 and E2M1.5 pumps



The Pump Filter Kit for the Edwards Pump includes the Oil Mist Eliminator, Koby Charcoal Trap and all the fittings needed to attach this two filter system on the Edwards series of vacuum pumps. This kit is to be used with Edwards models E2M0.7, E2M1 and E2M1.5 vacuum pumps. It can also be used with any other manufacturers pumps that have an NW10 flange type fitting on the exhaust port.

Part No.	Description	Price
FK251	Edwards Small Filter Kit	\$205.70

Kit Part # FK251



TECHNICAL APPLICATION NOTES

Replacing an Electron Multiplier in the Agilent (HP) 5973 MSD

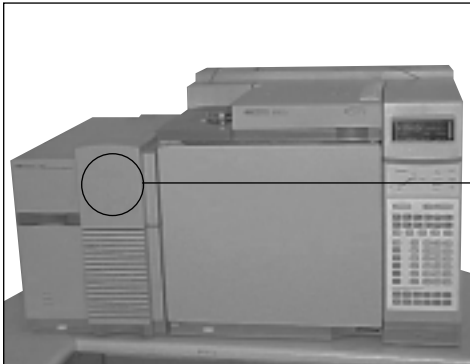
Jay S. Ray - Detector Technology, Inc.

Replacing an electron multiplier can be successfully accomplished in just 15 minutes after the instrument is cooled down to the touch. All that is required are a pair of clean room gloves and the DeTech Model 2300 Electron Multiplier.



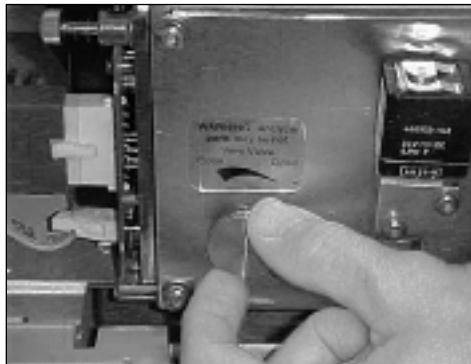
DeTech Model 2300

Step 1



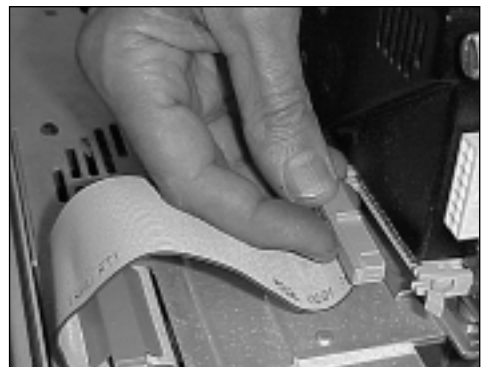
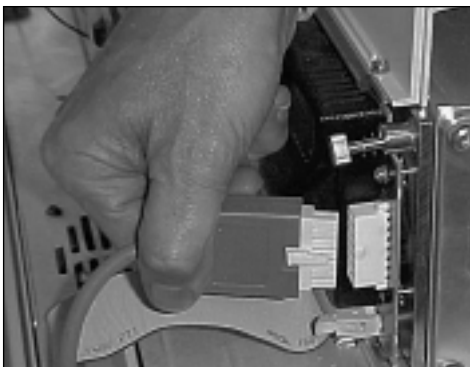
Remove the top cover of the Mass Spectrometer.

Step 2



Vent the instrument. Make sure that all voltages applied to the multiplier and the conversion dynode are turned off prior to venting the system.

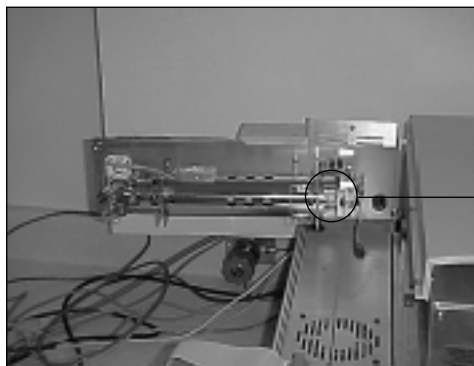
Step 3



Remove power and computer cables from the Mass Spectrometer.

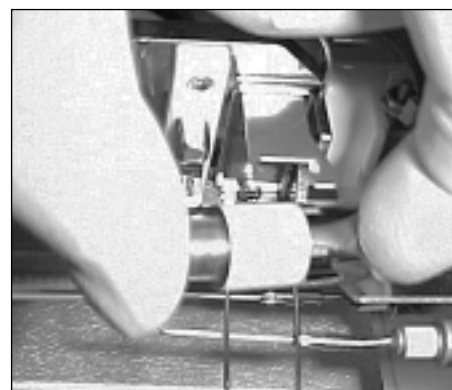
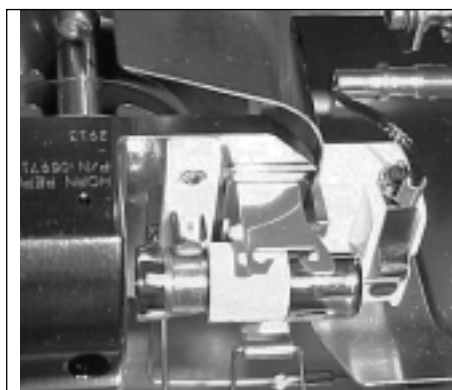
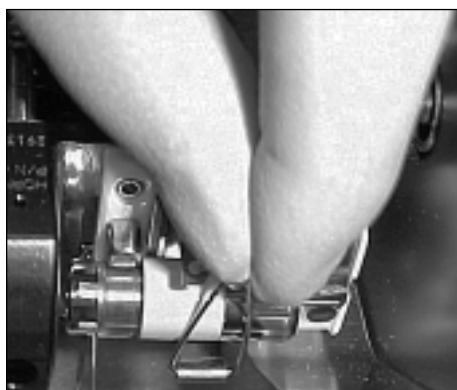
TECHNICAL APPLICATION NOTES

Step 4



Swing the Mass Spectrometer door open and locate the electron multiplier region.

Step 5



Put on a pair of clean room gloves. To remove the old multiplier, simply push together the mounting clips and allow them to open so you can gain access to the multiplier. Then reach in and remove the existing multiplier from the manufacturer's mount.

Step 6

Take the DeTech Model 2300 and install it into the existing manufacturer's mount. Close the clips.

When installing the new DeTech Model 2300 make sure of the following:

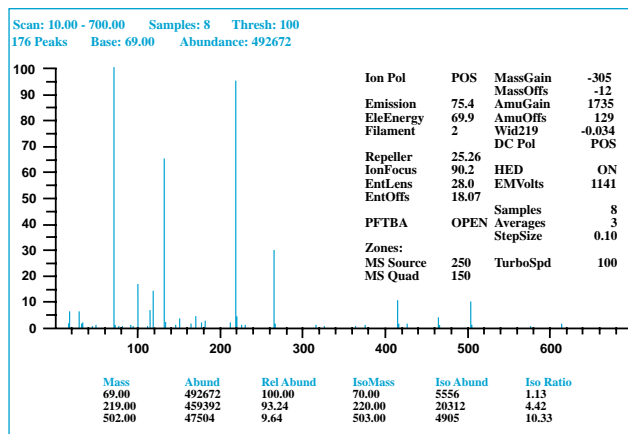
- 1) The Anode Pin (output) is making good contact with the output plate on the mounting frame.
- 2) The back arm of the spring clip is making contact with the electron multiplier's steel frame.



Close the Mass Spectrometer's door. Reconnect both the power and computer cables. Close the vent valve and replace the top cover.

Your installation is now complete. Turn on the vacuum pumps. Refer to your user's manual for pump time information.

Typical Autotune for DeTech Model 2300



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 Tel: (413) 284-9975 • Fax: (413) 284-9979
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 Detector Technology, Inc.

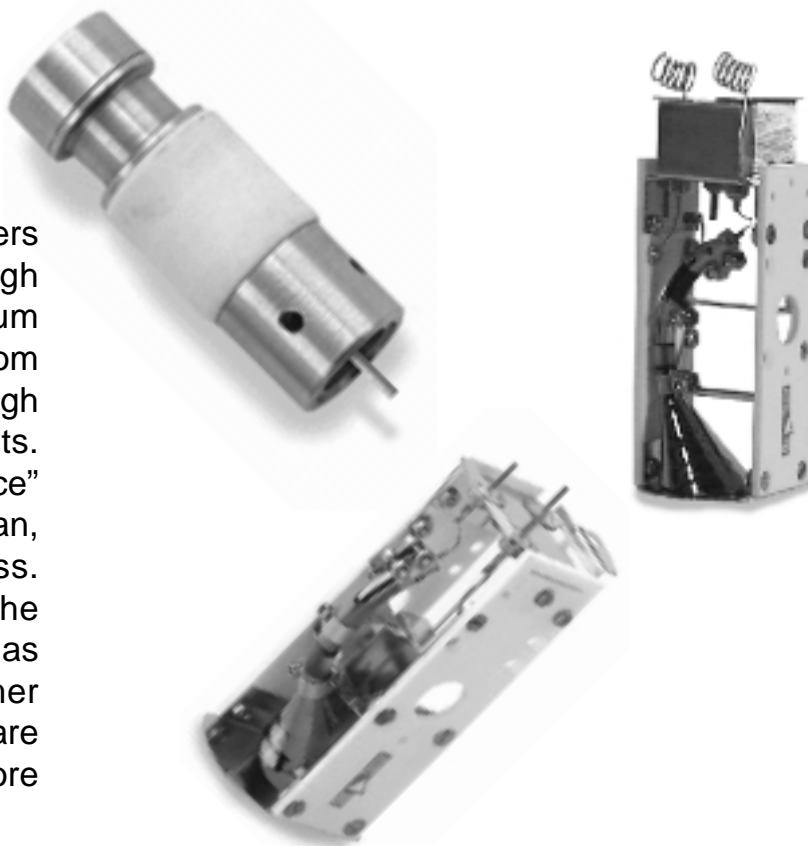
De Tech

Detector Technology, Inc.

“Committed to Excellence”

*Detech
Manufactures
a Complete Line of
Quality and Affordable
Electron Multipliers!*

The DeTech family of multipliers is engineered for high performance and maximum reliability in applications ranging from low gain analog amplification to high gain pulse counting requirements. DeTech’s “Committed to Excellence” philosophy is not just a fancy slogan, it’s the way they do business. DeTech is committed to the manufacturing of a quality product as well as providing total customer support. All DeTech multipliers are comprehensively 100% tested before being shipped.



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DISCOUNT

**on all DeTech Mass Spec Detectors
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Offer Good Through July 2000

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For Agilent Technologies (HP), Shimadzu, Finnigan & Varian GC/MS systems

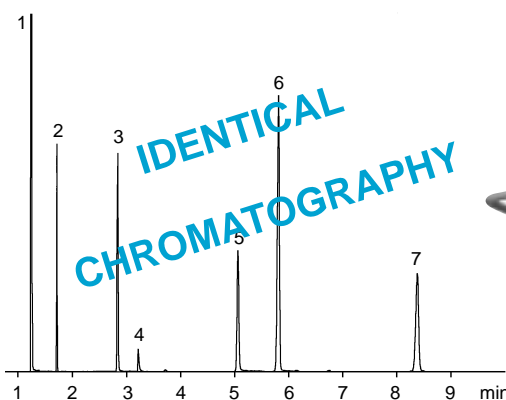
SAVE 6-12 HOURS



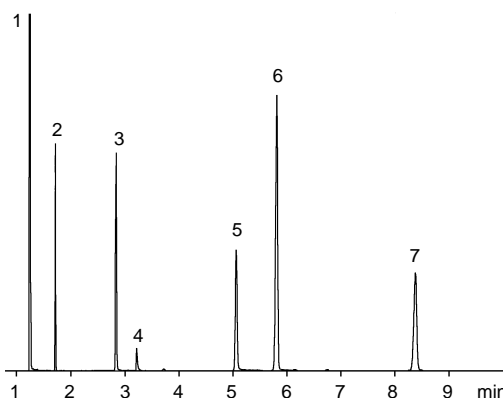
- ELIMINATES MS VENTING
- CONNECTS SIMPLY TO MS INLET AND GAS LINES
- PREVENTS MS AIR CONTAMINATION
- IMMEDIATE AIR/WATER CONFORMANCE

5 minute GC/MS Column Changeover

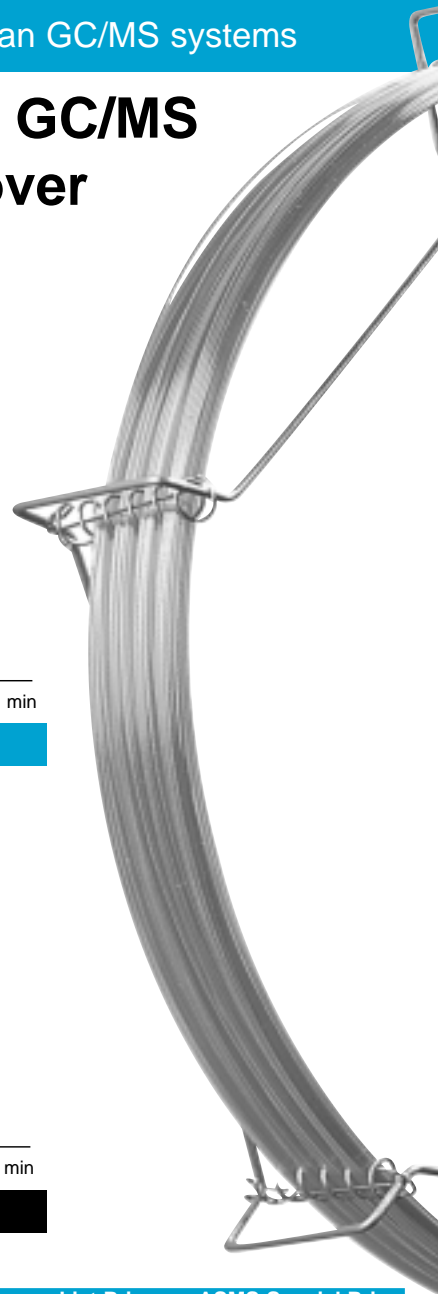
Peak 3 - 4-chlorophenol
Peak 4 - Decylamine
Peak 5 - Undecanol



WITH ms-NoVent™



WITHOUT ms-NoVent™



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Save 10%**

Part No.	Description	List Price	ASMS Special Price
113400	Ms-NoVent Interface	\$ 650.00	\$585.00
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113409	HP5973 2 x Restrictor	\$50.00	\$45.00
113424	HP5988A 2 x Restrictor	\$50.00	\$45.00
113422	HP5989 Engine 2 x Restrictor	\$56.00	\$50.40
113419	GCQ 2 x Restrictor,1 x Adapter	\$82.00	\$73.80
113426	SSQ7000 2 x Restrictor,1 x Adapter	\$80.00	\$72.00
113410	MS 5000/5050 2 x Restrictor,1 x Adapter	\$82.00	\$73.80
113412	Saturn 2000 2 x Restrictor,1 x Adapter	\$82.00	\$73.80
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Time:

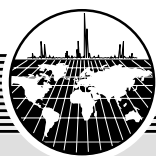
7:30 - 10:30pm Hospitality Suite
12:00 - 1:00pm Lunchtime Lectures

Place:

Hyatt Hotel
Hyatt Seaview C (First Floor)

Lunchtime Lecture Presentations at the SIS Hospitality Suite

- Monday: Applications of the AutoDesorb System -
Stuart Batterman - University of Michigan
- Tuesday: "How AMDIS Could Have Saved my
Sister's Marriage" - Dave Sparkman - NIST
- Wednesday: "LC/MS Fundamentals and Applications" -
Mike S. Lee - Milestone Development Services



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Mass Spec User Survey

Name _____

Company _____

Address _____

Phone: _____ FAX: _____

e-mail: _____

1. Would you like:

- S.I.S. GC/MS Supplies Catalog
 Printed CD
- Mass Spec Source Newsletter
- S.I.S. monthly e-mail newsletter
- A Software DEMO CD for NIST'98, SIMION 3D, and ProLab

2. Please check technique(s) you use:

- EI/CI CF/FAB LC/MS TOF
- Electrospray Thermospray Direct Probe ICP/MS
- APCI CE/MS FAB

3. What Mass Spectrometer(s) do you have in your lab?

Finnigan MAT

- 4500/4600 GCQ
- MAT90 LCQ
- Incos 50/500XL Ion Trap
- Trace/AQA ICP MS
- TSQ 70/700/7000 Other _____

Agilent Technologies

- 5970 5985/5988
- 5971 5989
- 5972 5990
- 5973 GCD
- 1100LC/MSD

VG/Fisons/MicroMass

- 70/70, ZAB Autospec
- Platform TRIO 1000/2000
- LC/MS Quattro
- MD800 Other _____

Varian

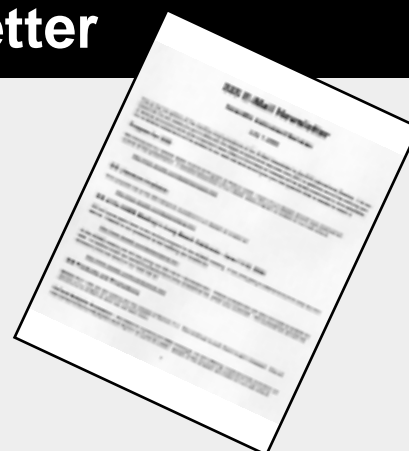
- Saturn I, II, III Saturn 2000

Other Manufacturers

- JEOL Extrel
- Sciex Shimadzu
- Hitachi Vestec
- Nermag Balzers
- Perkin-Elmer QMass Nicolet
- Waters Integrity Bruker
- PE Bio Mariner Leybold Inficon
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