BOLETIN DE PRODUCTO:

Detector Olfativo y Sistema de Concentración

- Sniffer 9000
- Prep 9000

Doc: Prod2_80

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CROMATOGRAFIA Y ESPECTROMETRIA

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Sniffer 9000

GC-Olfactometry: Method for Flavor and Fragrances industry

Most comfortable position for the panelist
Heated transfer line (100-350C)
Make-up gas
Humid air supply
Build-in intensity generator
Available with multiple ports configuration for panel studies
Available as upgrade for existing GC or as complete GC-O system

Available Options : Software option - Fingerspan for accurate odor intensity rendering - Test and training kit - Voice recognition software

The Sniffer 9000 system is the best tool to get your GC-O run done. Ingenieria Analítica has been involved in GC-O for more than 25 years. We served some of the most recognized Fragrance and Flavor companies.

In the past decades, many detection techniques have been hyphenated to gas chromatography. Less attention has been paid to GC-olfactometry (GC-O) in which the human nose plays the role of the detector. However, the human nose is often more sensitive than any physical detector, and GC-O exhibits powerful capabilities that can be applied to flavors and perfumes, as well as to any odoriferous products (e.g. pollutants). Olfactometric (or "sniffing") techniques allow the determination of impact odorants in food. They can be classified into two categories: dilution methods, which are based on successive dilution of an aroma extract until no odor is perceived at the sniffing port of the chromatograph; and intensity methods, in which the aroma extract is only injected once but the panelist records the odor intensity as a function of time by moving the cursor of a variable resistor. The Sniffer 9000 System is designed to be a dedicated "Sniffing-Device" as a stand-alone unit to be connected to any GC available on the market. The new Electronic- and Pneumatic design, based on a new industry standard (LON) provides maximum flexibility for future needs thus protecting your investments in the Laboratory.

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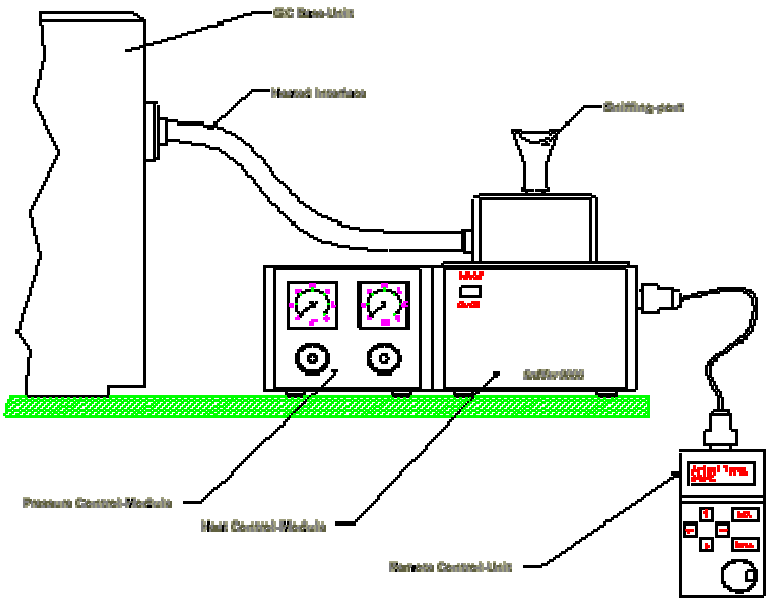
The sniffer 9000 offers a very comfortable position during the GC-O run

Sniffer 9000 - Principle of operation

The GC-Olfactometry is in theory a simple method. At the end of a chromatographic column a split is installed and allows the sample to be splitted (e.g. 1:50) FID Detector/nose. The peak/odor impression correlation will then be performed by specialized fragrance chemists.



Sniffer 9000 - Technical description

As heart of the Sniffer 9000 technology is the dedicated GC/Olfactometer heated Interface. Ingenieria Analítica has over 25 years experience in implementing hyphenated techniques by using special designed interfaces. The Sniffer 9000 interface is engineered to transfer the high resolution available on capillary columns to the olfactometry "Sniffing Port" air delivered by any Capillary column without loss of GC resolution and influence of oxidation or turbulence. Built as part of the current Sniffer 9000 System, the interface is manufactured from a single Stainless steel tube which is heated by direct current, thus giving the best possible temperature profile. The interface consists of a standard fused silica line resulting in

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an inert olfactometer interface. Engineered to combine hot column effluents with laminar streams of inert make-up gas generated by the Sniffer 9000 System and additional humidified air supply to deliver distinct odorants to humans subjects with minimum discomfort and maximum separation. Integrated into any GC System available on the market, IA's Sniffing 9000 System is one of the most flexible GC/Olfactometer Systems available on the market. A special analog output allows the Sniffer 9000 to be connected to an additional Channel on an existing data system, or any integrator or recorder available in the lab, to record intensity via the integrated cursor wheel on the handheld Remote control unit.

GC-Olfactometry: Available Options

Sniffer 9000 - Software option P/N BR91000080

The sniffer 9000 software option add the following possibilities:

- Temperature programming of the heated interface
- Dynamic adjustment of the intensity for support of Fingerspan
- Full scale marker using F2 button
- Additional analog output ranges

Sniffer 9000 - Test and Training kit P/N BR91000085

The SNIFFER 9000 training and test kit has been carefully developed for user training.
The kit consists of a 30 meter column, a standard mixture of 17 components, Pressfit, pre columns ferrules and a full set of documentation including the description of the standard mixture, reference chromatograms, different flow rates to be used and tips and tricks on how to get the best performance with your GC-Olfactive system.
This training or test is a powerful tool for user training and for learning how to work with GC-O and the SNIFFER 9000.

Sniffer 9000 - Nose to Text Voice recognition software P/N BR-NTTPRFERED-ENG

Recording impression during a GC-O run is a challenge. Having an assistant writing down the comments and retention time is an inefficient way of doing so. Other method will distract the panelist. Once again IA has try to find a solution where the panelist can record both retention time and comments made with the least disturbance. We came up with voice recognition. Nothing is more natural than talking. While the panelist smells the effluent he just speak out. Nose to Text recognizes the words and place them in a text box along with the retention time. As an added value, it includes extensive reporting functions and library search capabilities.

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GC-Olfactometry Voice Recognition Software

- Recognize the comments spoken and add them with the retention time.
- Merge recognized data with GC report
- Report of results by odor with multiple file comparison
- Target Odor report with multiple file comparison
- Support multiple GC data system
- Creation of custom odor library, including compound name, odor description, retention indexes for up to 10 columns, 6 custom fields (example: MW, Formula, Synonym,...)
- Search of results by odor
- Extended search by odor, compound name, or other custom fields

Nose to text is based on the leading voice recognition software.
It responds to voice command for initiating, starting and stopping the run. During the run the comments recognized are added to a text area along with the retention time.
After the run the data can be merged with the GC report. For best results and best matching it is recommend to use the odor intensity trace rather than the FID signal.

Nose to text - Reporting function

Nose to text includes a reporting function. Several reports can be created:

- Simple report (retention time odor)
- Merging of data to the GC report
- Custom odor report with multiple file comparison
- Target odor report with multiple file comparison

A custom odor library is supplied with Nose to Text. The library is designed to be easily be customized and your database can be imported into Nose to Text.

The library include the following fields:

- Compound name
- Odor description
- Up to 6 custom fields for information such as MW, Formula, Synonyms, etc...
- Retention indexes for up to 10 columns

Search can be performed by Compound name, odor description, or any custom fields.

The importing of data into the library is done from a Tab separated text file.

GC-olfactometry (GC-O) is the technique in which the human nose plays the role of the detector. It is a powerful technique that requires the full attention of the person sniffing.
Therefore, it is very difficult to write the retention time and comments made during the run. The solution was until now to have two persons one sniffing, and one writing down the comments. Nose to Text is the ideal solution.

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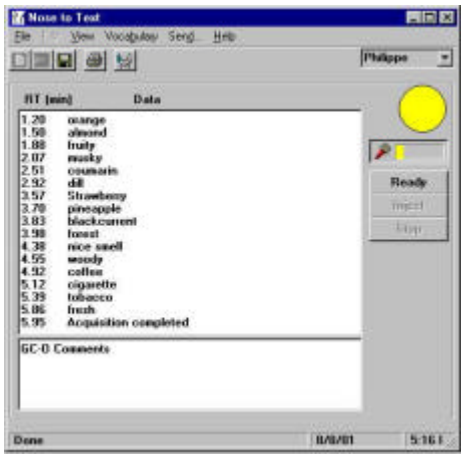


```
Report generated by Nose to text
Speaker:        Philippe
Report created on       8/8/01 at 4:21:52 PM

Comments        GC-O run comments |

RT      Data

0.31    banana
0.51    Apple
1.69    Acquisition completed
```

The Nose to text interface has been carefully designed to let you concentrate on the olfactometry part of the run. A visual display indicates the status of the software.

Nose to Text report

Report created on 8/25/01 At 6:52:42 AM
Report created by Philippe
Report comments: Test reporting NTT. Target
GC-O Comments:
Target odor. GC-O data used

-	Datafile2		Datafile1	
Odor description	Intensity	Descriptive	Intensity	Descriptive
Apple	Not detected		strong	Fruity -
Banana	faint	nice	faint	nice -
Fish	Not detected		Strong	Yuck -
Strawberry	Not detected		Strong	Fruity -

Target odor report with two files (Datafile2 and Datafile1) compared
Targeted odor are: Apple, Banana, Fish, Strawberry

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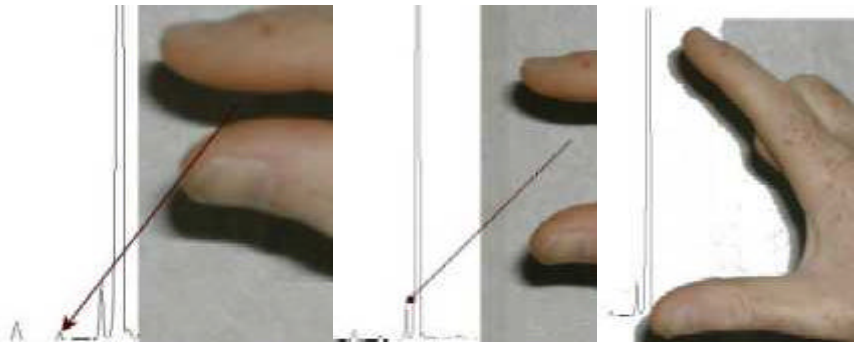
Sniffer 9000 - Fingerspan option P/N BR91000081

The fingersan is a design to generate intensity with reproducibility and without taking the panelist's focus away from the odor identification.
As the odor intensity increases the panelist spread his (her) fingers. The more the fingers are spread the more intense the signal.



Small peak - Medium peak - Large peak

The fingerspan let the panelist generate the intensity so that he remains focused on the smell. It is a very intuitive approach to the odor intensity generation.

This option is installed directly to the remote hand controller of the SNIFFER 9000 and requires the Software option to be able to use the dynamic adjustment of intensity. This feature allows the user to adjust the full-scale of the intensity marker to his personal distance between thumb and major or index finger. This way, the intensity indicated is always the same even if different panelists are working with the same instrument.

Sniffer 9000 - Multiport system

Panel studies are time consuming but yield to valuable information. The possibility of running one sample and get the result from three panelist is very valuable. The Sniffer 9000 can be installed with three ports in parallel. With a single injection the sample is split between the FID and the three sniffing ports.

The Sniffer 9000 three port system allows all the panelists to smell the same compounds at the same time. Some panelists do not detect specific odor (partial anosmia). The three port system solve this problem by having different panelists smelling.

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10 reasons to buy a Sniffer 9000

1 Commitment of Ingeniería Analítica

IA is committed to your satisfaction. Olfactometry is not a new technique. IA has over 25 years experience in this field. With the recently released options we offer the GC-O community the best tool to get the job done right.

2 Test and Training kit available

Training is a key factor to get good results in GC-O. The Test and Training kit let the panelist start the training to get the best of your system. It comes complete with a column, the sample and the documentation.

3 Fingerspan option

The Fingerspan option is the first of the released option. It permits accurate rendering of the odor intensity without disturbing your concentration. As you smell a peak, you spread your fingers apart to generate the intensity.

4 High precision heated transfer line

Getting compound eluting from the GC to the nose can be tricky. The temperature-regulated interface avoids compounds condensation giving you sharp "peaks".

5 Temperature programmable interface

By programming the interface temperature thermo-liable compounds remain intact. Also compounds eluting at higher temperature do not condense in the transfer line.

6 Comfort offered

Comfort is an essential parameter, often overlooked in GC-O, especially during long GC-O runs. The Sniffer9000 offers the best position away from any source of heat.

7 Humid air added before heated interface

Addition of humid air is crucial to the comfort. By preventing nasal dryness, the user can maintain equal sensitivity through the run. By adding the humid air before the transfer line we prevent water condensation on the nose cone.

8 Multiple port configuration

What a better way to compare the results from a panel than having the panelists smelling the same compounds. Up to three ports can be installed in parallel. The 140cm interface permits sufficient space between each panelist

9 Nose to Text

This is yet another demonstration of IA's dynamism and commitment to GC-O. Nose to Text is the first GC-O voice recognition software that records the comments made along with the retention time. Powerful reports either for GC specialists or non-GC specialists can be generated using the GC-O Data.

10 Easily upgraded to our fraction collector the Prep9000

Some of the compounds can be smelled but not detected. You must be able to concentrate such compounds. The Sniffer9000 can be configured as a fraction collector in minutes.

No other sniffing port offers you so much. The Sniffer9000 is the definitely the best tool for GC-O.

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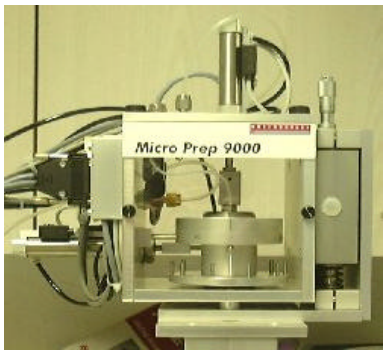
Prep 9000

Identify low level compounds, Confirm results, Collect standards



- Separate complex mixture and structural isomers
- Isolate impurity or low level compound for identification.
- Isolate compounds for use as standard
- Collect compounds for study by other technique such as NMR, UV-Vis, IR...
- Collection of compounds detected by GC-O.

The new PREP 9000 System based on the SNIFFER 9000 System has been completely redesigned to fit the future needs. The PREP9000 System is now available as a stand alone unit and has been designed to be a dedicated Preparative System connected to any GC available on the market by using a flexible heated interface line. The new Electronic and Pneumatic design, based on the new industry standard (LON) allows the system to be as flexible as possible for the future needs and to protect your investments in the Laboratory.
The Prep 9000 can easily be installed on the Sniffer 9000.

The sample collection is based on a repetitive absorption of eluting compounds, after separation from a capillary column. Optimization is easily performed during a supervised GC run in a semi automatic mode. Repetitive sample processing is easily achieved with the aid of computers. Using simple logical decisions, they are able to reliable supervise even complex systems. Based on the FID signal of a reference substance the system directs the column effluent at any given time (using the time event table of any Data Handling System) into the collecting system where the individual compounds of interest are adsorbed.

Prep 9000 - Principle of operation

The vials containing the mixture to be separated are placed into an Automatic Sampler. The sample is injected using the On-Column or split/splitless injector on conditioned 0.32 mm i.d. capillary columns. Small glass tubes filled with an adsorbent are used for sample collection. They are inserted in a specially designed revolving carrousel, which is installed at the end of the transfer line. The eluting flow can be directed either to the detector (i.e. FID) or to the PREP 9000. During normal run conditions, the whole column effluent flows to the detector. At a set time, the effluent is completely diverted into the adsorption tube.
This is accomplished by the following mechanism: The absorption tube is connected on one end to the transfer line, and on the other end to a vacuum. The vacuum is activated by opening a valve. When the vacuum valve is opened, the whole effluent passes through the adsorption tube, so efficiently that the FID signal becomes negative. During normal operation the vacuum valve is closed, the splitter branch

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leading to the adsorption tube is closed. Therefore, the column effluent is forced to flow through the splitter branch leading to the FID and does not contaminate the adsorption tube. Changing over from one fraction to another is performed by turning the pneumatically driven revolving fraction collector. This procedure needs about 2 seconds. Any loss of sample during this time can be neglected, particularly since it is preferable anyway to collect neighboring peaks in such a way that the overlapping zone, which is generally larger than 2 seconds, is not collected. For resolved peaks, the sample loss between the peak valleys is negligible. Generally, the ratio between bleed and sample improves if the eluting sample is not collected at the bottom of either slope. Furthermore, the information gained from a spectrum of pure sample is more valuable than from a sample containing 10 to 20% impurities. Collected fractions can be stored or be desorbed with a suitable solvent for subsequent analysis, e.g. NMR, UV, IR, micro chemical reactions, and biological activity tests.

Prep 9000 - Technical description

The Prep 9000 consist of the Heated transfer line, the prep head (carousel), the Hand control module and the power supply units.

The Prep is designed to be easily fitted on the sniffer 9000 and changing from one to the other takes less than 30 minutes.

The smart I/O Interface Card is designed for easy connection with any GC and autosamplers. This is essential for unattended operations.

The Prep is available as a standalone unit for upgrade of existing GC or as a complete micro-preparative station including the GC, Prep 9000, data system.

Prep 9000 - Software

The Prep 9000 comes with Prep recovery software. This software helps you predict the number of collection needed to achieve a specific amount as well as a the recovery factor of the overall process.

Simple to use, flexible, straight forward, it a great tool for everybody involved in fraction collection.