

***Automotive volatile organic compounds
(VOCs) emitting from a new vehicles.
Procedures and requirements to conduct
various industry VOC testing protocols.***

October 27, 2006

Joe Franklin,

Technical and Business Development Manager

Presentation Summary

- **History of VOC testing**
- **Common Sources of VOC's in vehicle interiors**
- **Current Automotive VOC specifications**
 - **European**
 - Individual parts contribution
 - Complete vehicle interiors
 - **Japanese**
 - Individual parts contribution
 - Complete vehicle interiors
- **Analysis requirements**
- **Collection & Analysis techniques**
- **Possibilities for the future**



- **Automotive Exhaust emission testing and controls**
- **Home interiors testing and controls – Sick House**
- **European Automotive interiors testing and controls**
 - **Parts contribution limited**
- **Japanese Automotive interiors testing and controls**
 - **Parts contribution limited**
- **US Suppliers to Europe and Japan**
- **US Auto manufacturers begin to work toward lower interior VOC's**
- **Future needs, Government Regulation to come?**

...Leads to Focus by US Manufacturers.

Sources of Auto Interior VOC's...

- **Glues**
- **Fabric**
- **Carpet**
- **Molded parts**
- **Electronic accessories**
- **Electronic control systems**
- **Lubricants on moving parts**
- **Manufacturing residues**
- **Exhaust system and engine compartment leaks**



...that lead to total Auto VOC's.

- **Nissan Standards and procedures – Interior components**
- **Mazda Standards and procedures – Interior components**
- **Toyota Standards and procedures – Interior components**

- **JAMA Standards and procedures – Full Vehicle interior**

Specified Compounds		Specified Compound Classifications
2-Pentylfuran	Ethyl benzene	Aromatic hydrocarbons
Acetaldehyde	Ethyl toluene	Aliphatic hydrocarbons
Acetic acid	Ethylhexanol	Cycloalkanes
Acetonitrile	Fenobucarb	Terpenes
Benzaldehyde	Formaldehyde	Alcohols
Benzene	Hexanoic Acid	Glycols/Glycol Ethers
BHT	Methenamine	Aldehydes
Butoxyethanol	Methyl pyrrolidone	Ketones
Chlorobenzene	Naphthalene	Esters
Chlorpyrifos	Nonanol	Nitrosamines
Chlorpyrifos	n-tetradecene	Amines
Di 2-ethylhexyl phthalate	Paradichlorobenzene	Phénols
Di-2-ethylhexyl phthalate	Phenol	Phthalates
Diazinon	Styrene	Halogenated hydrocarbons
Dichloroethane	Tetradecane	
Dichloroethyl ethyl ether	Tetrahydrofuran	
Di-n-butyl phthalate	Toluene	
Dodecane	TXIB	
Dodecanol	Xylene	

Collection Chambers

- Range from canisters to large tedlar bags for parts



- To full vehicle sheds designed to control temperature and air flow

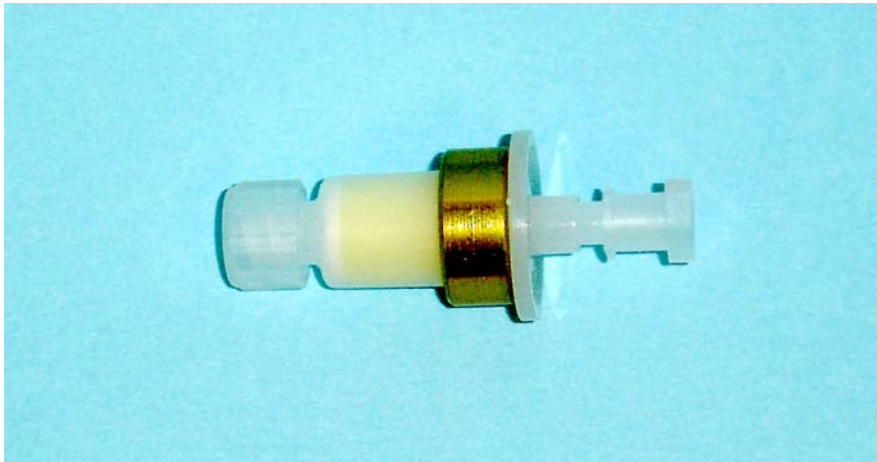


Sampling Systems

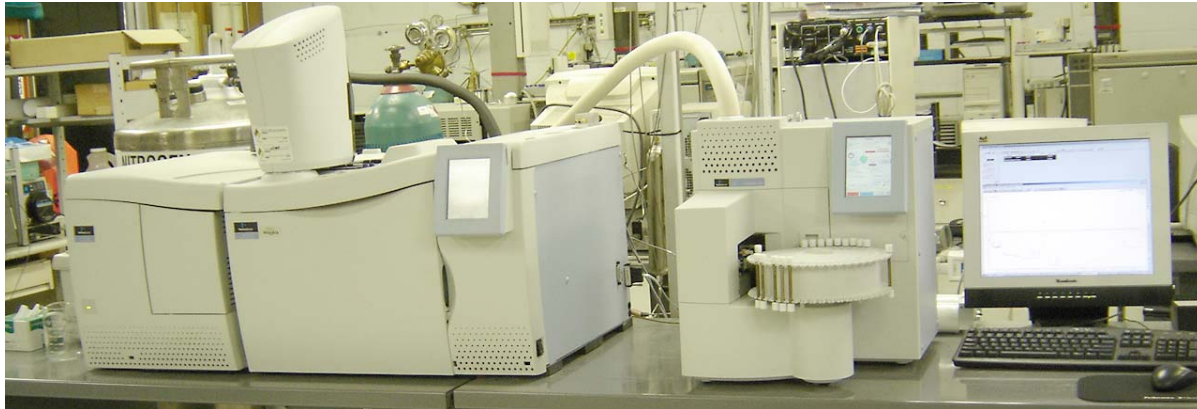
- **TENAX Tubes – collect Aliphatic and Aromatic Hydrocarbons**



- **DNP Cartridges – collect Aldehydes and Ketones**



- **GC/MS – Gas Chromatograph with fully integrated Mass Spectrometer detection system and Thermal desorption sample station.**



- **HPLC – High performance liquid chromatograph with UV detection system.**



