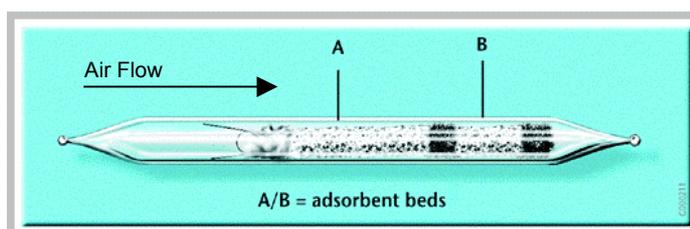


ENVIRONMENTAL NEWS

ISSUE 14, MARCH 2001

AIR ANALYSIS

Exposure to airborne toxic contaminants in work place and industrial atmospheres has caused growing concerns in recent years. Methodologies developed by NIOSH (National Institute for Occupational Safety and Health) have been adopted by ALS for the determination of a range of Volatile Organic Compounds (VOC) and Semi-volatile Organic Compounds (SVOC) in packed glass sorbent sampling tubes. These sorbent sampling tubes are designed to allow a known volume of air to be drawn through with a calibrated sampling pump. The compounds of concern are trapped and their concentrations per cubic metre of air determined. The two sections of the tube are analysed separately; the front section (A as shown below) traps the airborne analyte, and the rear section (B) monitors breakthrough, and possible analyte loss.



Volatile Organic Compounds (VOC's)

A range of volatile compounds are trapped on sorbent tubes packed with coconut shell charcoal. This sampling medium is useful in determining compliance with permissible exposure limits (PEL's) where solvents and other volatile compounds may be of concern. The sampling tube may be worn by an individual, or placed in-situ for background level determinations.

Routine VOC analytical suites offered by ALS are listed below:-

<u>EP-091A : Aliphatic Hydrocarbons</u>	
Heptane	Decane
1-Heptene	
<u>EP-091B : Monocyclic Aromatics</u>	
Benzene	Styrene
Toluene	1,2,4-Trimethylbenzene
Ethylbenzene	Isopropylbenzene
o-Xylene	1,3,5-Trimethylbenzene
m-Xylene	n-Butylbenzene
p-Xylene	

<u>EP-091C : Oxygenated Compounds</u>	
Acetone	2-Hexanone (MBK)
2-Butanone (MEK)	Cyclohexanone
4-Methyl-2-pentanone (MIBK)	
<u>EP-091D : Halogenated Compounds</u>	
1,1-Dichloroethane	4-Chlorotoluene
Chloroform	1,3-Dichlorobenzene
Trichloroethene	1,4-Dichlorobenzene
Chlorobenzene	1,2-Dichlorobenzene
2-Chlorotoluene	Hexachlorobutadiene

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Semi-Volatile Organic Compounds (SVOC's)

Workplace Monitoring

Semi-volatile compounds are sampled by a similar means to the method used for volatile compounds. Given the higher molecular weight of SVOC, a pre-filter is often incorporated to account for the particulate load as well as the gaseous load of a sample of air. ALS analyses the Teflon pre-filter and XAD-2 washed sorbent tube for Polycyclic aromatic hydrocarbons (PAH's), Chlorobenzenes and Chlorophenols according to NIOSH methods, using GC/MS detection. The extraction process involves separation and analysis of the front and back sections of the sorbent tube, as well as the teflon pre-filter. This process of sample collection and analysis is suited to workplace indoor air quality and personal air monitoring, and is limited to sampling up to 1000L (1m³) of air at a flow rate of 2L/min.

Field Monitoring

A modified high volume air sampling device, ideal for sampling <1000 m³ is fitted with a PUF (polyurethane foam) canister, with a glass fibre pre-filter enabling differentiation between the gaseous and particulate loads of an air sample. Typically this configuration would be utilized for large scale outdoor sampling (e.g. construction sites or remediation projects). The ability to differentiate the solid and gaseous loads assists in the tracing of contaminant origins and aids in stack plume dispersion modeling.

Routine SVOC analysis suites offered by ALS are listed below:-

Polycyclic Aromatic Hydrocarbons EP-077A

Naphthalene	Chrysene
Acenaphthylene	Benzo[a] anthracene
Acenaphthene	Benzo[b] fluoranthene
Fluorene	Benzo[k] fluoranthene
Phenanthrene	Benzo[a] pyrene
Anthracene	Indeno[1,2,3-cd] pyrene
Fluoranthene	Dibenz[ah] anthracene
Pyrene	Benzo[ghi] perylene

Chlorinated Phenolic Compounds EP-077B

2,4-Dichlorophenol	2,4,5-Trichlorophenol
2,6-Dichlorophenol	2,3,4,6-Tetrachlorophenol
2,4,6-Trichlorophenol	Pentachlorophenol

Chlorinated Benzene Compounds EP-077C

1,2,4 - Trichlorobenzene	Pentachlorobenzene
1,2,4,5 - Tetrachlorobenzene	Hexachlorobenzene
1,2,3,4 - Tetrachlorobenzene	
1,2,3,5 - Tetrachlorobenzene	

High Volume Air Samples (HVAS)

The determination of Total Suspended Particulates (TSP) and PM10 (Particulate Matter <10µm) can also be carried out on filters according to AS2724.3-1984 and AS3580.9.6-1991. Particulate base metals are determined by ICPMS or ICPAES.

Static Dust Gauges

Static dusts are analysed for parameters as outlined in AS3580.10.1-1991. This methodology provides information relevant to mine sites and construction sites, where deposited dust criteria have been established, and are monitored to comply with licence requirements.
