



Environmental Monitoring of Contaminated Atmospheres

COSHH and Health and Safety Compliance

In order to comply with **Control of Substances Hazardous to Health (COSHH)** regulations companies have a mandatory responsibility to provide appropriate **Health and Safety** care for personnel working within their business.

“Harmful” substances are present in various forms e.g.:-

- Chemicals
- Fumes
- Dusts
- Fibres.

These substances are assigned **Occupational Exposure Limits (OEL's)** as prescribed by the Health and Safety Executive. To ensure compliance with current regulations, exposure/risks can be quantified by introducing environmental monitoring.



Benefits of Environmental Monitoring

- It can be useful in validating the integrity of atmosphere cleanliness where industrial process requirements dictate.
- Monitoring gives assurance to employees regarding the health and safety of their working environment.



Fig.1 Typical equipment for collection of airborne particulates.

LPD Lab Services Limited

– a unique combination of analytical equipment, techniques, and investigative experience

Sampling Procedures and Measurement

The monitoring and collection of atmospheric particulates can be a relatively simple procedure, which involves sampling an atmosphere using a filter and pump system (see fig. 1). An assessment of the atmosphere to be sampled is needed to determine appropriate sampling times (anything from 2 – 8 hours, depending on the levels of particulates encountered). This type of collection and monitoring is ideally suited to internal factory environments, e.g., toxic dust emissions, which could impair or endanger employee health and safety.

The frequency of sampling is generally on a quarterly basis, following initial assessment to determine typical backgrounds.

Collection using sampling equipment for total and/or respirable dusts and analysis, both qualitative and quantitative, can be carried out (depending on the complexity of particulate composition), using thin film techniques by X-Ray Fluorescence (XRF) spectrometry (See Fig.2).

Assurance

Reference materials are used to establish a calibration that can be customised to the requirements of the analysis.

XRF provides an efficient, robust response in identifying any potential contamination concerns.

All equipment required to carry out representative monitoring can be provided.



Fig. 2.
X-Ray
Fluorescence
(XRF)
Instrument

Typical Routine Analyses and OEL

'Analysis of airborne dust collected from a glass chemical raw material mixing area.'

A range of chemical elements are assessed sequentially, which include Antimony, Cobalt, Nickel, Iron, Cerium, Barium, Calcium, Potassium, Silica, Sodium, Magnesium, Zirconium and Strontium. Results obtained from analyses are reported in $\mu\text{g}/\text{m}^3$. This enables direct comparisons to be made with the recommended **OEL concentrations** as approved by the **Health and Safety Commission**.

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Sb	3.3	-	-	-	-	-
Ni	-	-	-	-	-	-
Co	-	-	-	-	-	-
Fe	-	4.1	9.8	6.1	14.2	5.5
Ce	-	-	-	-	6.4	7.2
Ba	15.3	16.8	52.2	42.8	0	
Ca	14.4	-	3.6	70.7		
K	16.3	34	114.1	73.5		
SiO ₂	525.6	920.1	2,396	1,449	64.5	63.7
Na	208.6	193.5	255.4	299.1		
Mg	272.7	221.2	229.8	341.5	312.8	377.8
Zr	9.1	14.1	17.6	17.6		
Sr	15.8	19	55.6	51.4		
Cr		0.03	0.2		-	-
S		48.5	47.9		128	142.4
Mn					-	-
P					-	-
Al					8	4.9

Fig.3 A Typical XRF Output for some Airborne Dusts ($\mu\text{g}/\text{m}^3$).

Contact us today

Find out how we can help solve your problems in process improvement, process control and materials analysis

LPD Lab Services
Phone: +44 (0)1254 676074
E-mail: enquiries@lpdlabservices.co.uk
Web: www.lpdlabservices.co.uk