Personal Protection starts with Detection
What is occupational hygiene monitoring?
The British Occupational Hygiene Society (BOHS) defines occupational hygiene as being the prevention of ill-health from work, through recognising, evaluating and controlling the risks. In practice, this means controlling people’s exposure to hazards such as chemicals, heat stress, noise and vibration. In order to evaluate the risks, workplace monitoring is often required to determine the level of exposure to the hazard. 3M Monitor Badges allow you to monitor the exposure of workers to a large number of common volatile organic substances used in industry.

There are three main monitoring strategies for chemical inhalation:

Personal Exposure Monitoring
Personal exposure monitoring is carried out to monitor an employee’s exposure level for comparison with applicable health standards. The monitor badge is located in the employee’s breathing zone so that it will monitor the air that is inhaled.

Area Monitoring
Area monitoring is carried out to measure the concentration level in a given area. This can be useful to detect seasonal variation or process cycles and to evaluate engineering controls. However, this method cannot be used to measure personal exposure; area monitoring will often underestimate actual personal exposure as employees may work more closely to the source of the contaminant.

Source Monitoring
Source monitoring is done at the source of the contaminant. It may be used to evaluate the need for, or performance of, ventilation systems at the source of the contaminant. It may also be used to monitor the ‘worst case’ personal exposure.

Why do we need to carry out occupational hygiene monitoring?
Occupation hygiene monitoring is performed to determine the concentration levels of substances in the air. This is usually done for three main reasons, to:

Comply with the law
Regulation 7 of the Control of Substances Hazardous to Health (CoSHH) Regulations states that “Every employer shall ensure that the exposure of his employees to substances hazardous to health is either prevented or, where this is not reasonably practicable, adequately controlled”. In many situations it may only be possible to accurately know if you have adequately controlled the exposure by carrying out personal exposure monitoring. For a large number of substances the HSE have determined a Workplace Exposure Limit (WEL). This is the personal exposure concentration of a substance that must not be exceeded. Personal monitoring results can be compared to the WEL to help confirm compliance with the regulations.

Regulation 10 of the CoSHH regulations places a specific duty on employers to carry out monitoring when it is ‘requisite’. According to the accompanying Approved Code of Practice (ACoP), ‘requisite’ is defined as: when failure of the current control measure(s) could result in a serious health effect; when measurement is required so as to be sure that the WEL is not exceeded; as an additional check on the effectiveness of current control measures; and when there is a change in the work activity (be it equipment, process etc) that could increase the exposure.

Help you select the appropriate Respiratory Protective Equipment (RPE)
If other controls higher up the CoSHH ‘hierarchy of control’ are not practicable and you have decided that RPE is necessary to control the risk, the data from exposure monitoring should be used to help you decide what type of respirator will be appropriate. Every type of respirator is given an Assigned Protection Factor (APF). Respirators should be selected on the basis that the measured concentration, divided by the APF is less than the published WEL.

Protect your company
Monitoring results may be used in civil litigation to show whether or not an employee was over exposed during the time of their employment. Performing and recording the results of exposure monitoring allows you to defend your company and protect it from unfounded claims. To this end, undertaking occupational hygiene monitoring can also sometimes be required by your insurance company.
Developing a sound personal monitoring strategy

A monitoring strategy should define:

- what substance(s) you are monitoring for
- who (group or individual) you want to know the exposure levels for
- the number of samples that need to be taken
- when and how often the samples will be taken
- the number of field blanks that will be needed and when they should be prepared.

It is important when carrying out occupational hygiene monitoring to have a monitoring strategy that will provide results that will allow you to confidently make decisions about the effectiveness of your controls and the extent to which your employees are being exposed. Defining the number of samples, and when they are taken, is key to achieving this.

A single exposure measurement should not be used to make decisions regarding the exposure profile of an employee or group of employees. In order to characterise an exposure profile to a satisfactory level of confidence it may be necessary to take many samples. The more variable the process/task, the more results you will need, over a number of different times the process/task is run, to be able to compare the personal exposure data to the workplace exposure limits and base your controls upon those results.

3M recommends at least three samples should be collected on different days for those processes/tasks judged to have low variability in exposure levels. More samples will be required for processes with high variability.

Detailed and thorough guidance has been produced by both the Health and Safety Executive (HSE) and British Occupational Hygiene Society (BOHS) to help you devise suitable monitoring strategies. Both documents are free to download from their respective websites.


BOHS - Testing Compliance with Occupational Exposure Limits for Airborne Substances

Field Blanks

Depending on what sort of monitoring is being carried out, field blanks may be required. When sampling with 3M Monitor Badges field blanks must be gathered with every set of samples taken; their submission is a quality control requirement. Without the required number of blanks, sample results may be unreliable.

In the case of 3M Monitor Badges, a blank sample is a Monitor Badge of the same type as those that are being used to monitor with, but which have not been exposed to the contaminated environment. The purpose of the blank is to detect contamination that may have either pre-existed in the equipment, or was inadvertently introduced during shipping or storage. The required number of blanks is influenced by the different substances that are being analysed, the types of device being used to monitor and the number of different days on which the monitoring takes place.

Do I need to do repeat monitoring?

The extent to which repeat monitoring may be required can depend upon a number of different factors:

Variability in results

If the results that are generated by your initial monitoring show a high degree of variability, then it may be necessary to carry out more monitoring to build up a more comprehensive data set for your conclusions to be based upon. The high variability may show you that there are differences in individuals’ working practices or process controls; after these are addressed, additional monitoring maybe required to confirm the efficacy of your changes.

Work / environment changes

Repeat monitoring may also be required if there are changes in the process or the environment that you are monitoring. For example, a change in the mixture composition; the amount of cleaning solvent used; the location of the task is moved next to an area with better/worse ventilation; or the working schedules have changed so individuals are doing certain tasks for a longer or shorter time.

Routine monitoring

Employers may also wish to carry out monitoring on a routine basis to confirm that there have been no inadvertent or unknown changes to the process, task or environment that may have affected their employees’ personal exposure.
Record Keeping

It is important to accurately record the circumstances of your monitoring in as much detail as you can. This will allow you, a colleague, or potentially an enforcing body or insurance company representative to know exactly what you were monitoring and how you were monitoring it when looking back at your records in the future. Amongst other things, this will allow you to make accurate comparisons when carrying out further monitoring, enabling you to understand the effects of changes to your process, or even help you defend a claim by an employee.

In addition, the HSE requires that personal monitoring data is kept readily retrievable at any reasonable time for 40 years and in an easily understood form.

3M™ Monitor Badge Analysis Service

3M monitor badges are lightweight and simple to use. They are based on the principle of passive diffusion, containing an activated carbon substrate to which a large number of volatile organic substances can adsorb to. The badges are worn in the wearers’ breathing zone whilst they carry out their work, to replicate the personal exposure they are exposed to. The badges are then sent back to 3M where they are analysed by our experienced scientists, in our dedicated in-house UKAS accredited Occupational Hygiene laboratory (No. 1568).

What are the benefits of using the 3M Monitor Badge Analysis Service?

- No need for expensive consultants – the badges are simple to use and come with comprehensive user instructions.
- Accurate and reliable results - Analysis is carried out in-house at our dedicated UKAS accredited laboratory (No. 1568).
- Cost effective - No need to rent or buy expensive sampling equipment that may not be re-used, each badge purchased with prepaid analysis comes complete with the analysis of up to three different substances.
- Support & technical advice - All results come with a test certificate and explanation of results report to help you effectively use your data. This is all backed up by knowledgeable support staff that are just a phone call or email away.

@3M_UK_Safety

For more information on all our products, call 3M Personal Safety Division on 0870 60 800 60 (UK) and 1800 320 500 (Ireland) or visit www.3M.co.uk/safety