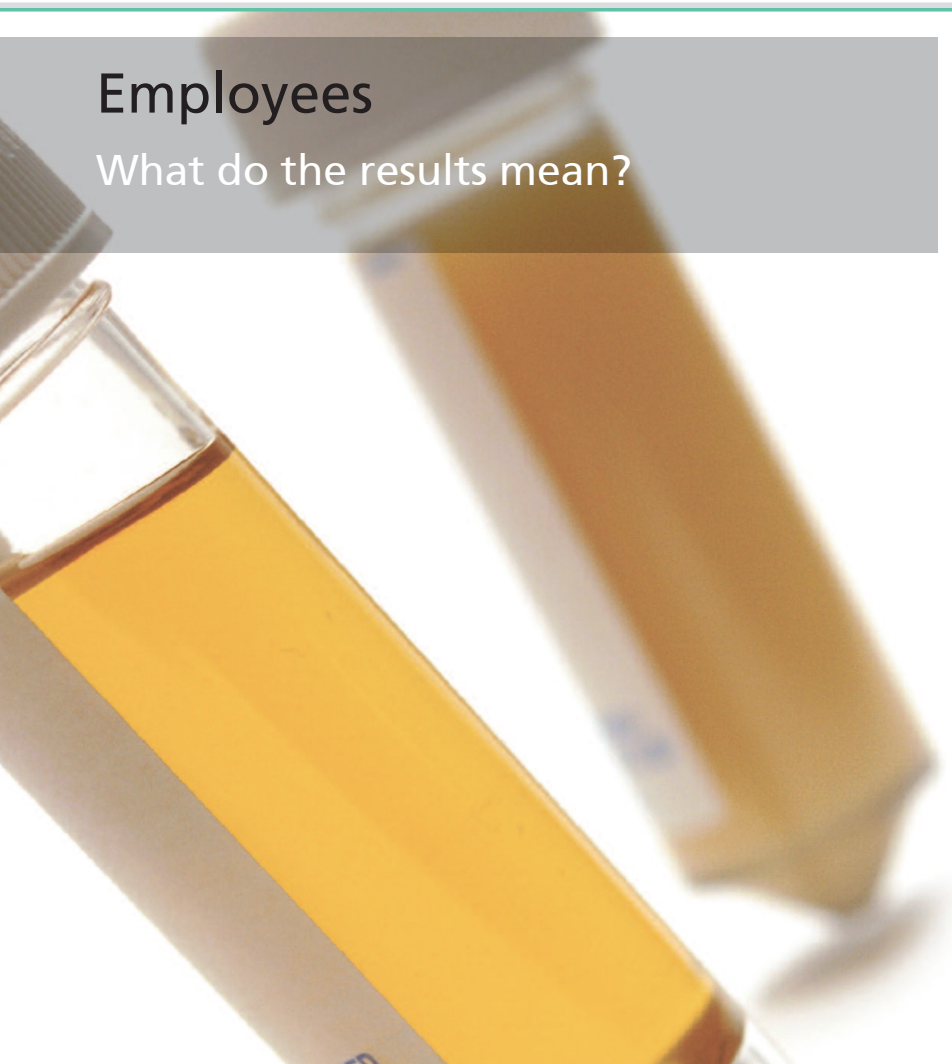


# Biological Monitoring For Isocyanates

Employees

What do the results mean?



The Health and Safety Laboratory is an  
Agency of the Health and Safety Executive

# Biological Monitoring For Isocyanates

## Urine analysis for isocyanates Part 1

### What is the problem with isocyanates?

'Isocyanates' occur in many 2-pack (2K) paints and other products. Breathing in isocyanates is the top cause of work-related asthma in Britain. If you get asthma from isocyanates you won't be able to work with them again.

When you spray isocyanate-containing paints you rely on your air-fed mask to protect you. But how do you know it is working properly? The simplest way is to look for traces of isocyanates in your urine (biological monitoring).

You probably see an occupational health doctor or nurse once a year to check your breathing etc. If so, we suggest they also get your urine sample (straight after you have been spraying isocyanates) and send it to the laboratory.

### Why analyse urine?

If you breathe in isocyanates, your body breaks them down and eliminates them in your urine. The more isocyanates you breathe in, the more breakdown products there will be. If controls are working correctly – e.g. your breathing apparatus is working and you are using it properly you will not breathe in any isocyanates and we will not find any breakdown products in your urine.

### Who needs monitoring?

Everyone who may breathe in isocyanates. Normally, this means sprayers.



### Is it compulsory?

You have a right to refuse giving a sample. But if you do, your employer may have to move you to another job. Besides, it is in your interest to make sure that you breathe in as little isocyanate as possible.

### Will anything else be measured?

No. The laboratory will only analyse your sample for isocyanate breakdown products and a substance called creatinine. Creatinine is in everyone's urine and it is measured to check the sample is urine (and not water) and to adjust the result for a weak or strong sample (depends on how much water, tea etc. you have been drinking). The laboratory will not analyse your sample for drugs, alcohol, pregnancy, HIV or anything else.



# Biological Monitoring For Isocyanates

## How? Part 2

### Informed consent

It is important that you understand what is being done and why, so you can give your informed consent. Your manager, or the person doing Your health check, will explain to you that

- They are checking that the isocyanate exposure controls in your workplace are adequate.
- They will ask you for a urine sample at the end of a session spraying isocyanate products. This will normally be done once a year, unless there is a problem.
- The laboratory will check for isocyanate breakdown products in your sample it will never look for drugs, alcohol etc without your permission.
- They will ask you if they can see your results because if there is a problem you will need to work together to sort out any problems

### How to collect samples

- The laboratory will provide a 30ml plastic bottle containing a little white preservative.
- You should direct a sample of urine into the bottle at the end of a work session, and close the bottle firmly. Nobody wants leaks!

- Label the bottle with your name and the date.
- Complete the sample request form, and tell us where to send the results.
- Put the bottle and form in our packaging. Send it to us by first class post.

### How often do I give a sample?

It depends. Your employers may wish to take several samples, until they are confident about the controls.

- With results that fall at or below the guidance value, give a sample once a year unless something changes
- With results that are above the guidance value, your employer should investigate, make changes and ask you to give another sample.



# Biological Monitoring For Isocyanates

## Results Part 3

The laboratory will report your results something like this:

Name	2,4 Toluenediamine µmol/mol creatinine	2,6 Toluenediamine µmol/mol creatinine	1,6 hexanediamine µmol/mol creatinine	IPDA µmol/mol creatinine	MDA µmol/mol creatinine
Your name	ND	ND	0.8	ND	ND
UK Guidance	1	1	1	1	1

The columns show the breakdown products of different types of isocyanates

2,4 toluenediisocyanate (TDI) breaks down to 2,4 toluenediamine

2,6 toluenediisocyanate (TDI) breaks down to 2,6 toluenediamine

hexamethylenediisocyanate (HDI) breaks down to 1,6 hexamethyldiamine

isophoronediiisocyanate (IPDI) breaks down to IPDA(u) (isophoronediamine)

methylenediphenyl diisocyanate (MDI) breaks down to MDA (methylenedianiline)

The levels are reported as 'µmol/mol creatinine' (micromol/mol creatinine) Creatinine is in everyone's urine and it is measured to adjust the result for a weak or strong sample (depends on how much water, tea etc. you have been drinking).

ND means none-detected and indicates that there was no exposure to isocyanates. If the results are either 'ND', or not greater than the guidance value of 1, the controls you were using on the day of your sample were giving adequate protection. If something changes, or you think something is wrong, ask to send in samples before the annual check.

### What do I do if I have a result above the guidance value?

If the results are above the guidance value of 1, your controls may not be working properly. For example, your air-fed mask may be damaged; the air supply inadequate or you may be taking your mask off before the booth has cleared of invisible mist. Your employer needs to re-check that everything is working correctly and will ask you for another sample to confirm that the improvements have worked.

**Important:** A result above 1 does not mean you will get asthma. It means that controls are not working properly.