A HEALTH AND SAFETY GUIDE TO PAINTING WITH ISOCYANATES
INTRODUCTION

Painting and spraying with isocyanate paints can cause risks to health and is the primary cause of occupational asthma in the UK. Workers most at risk tend to be vehicle paint sprayers working in bodyshops or in the commercial vehicle and trailer manufacturing industries. These workers are 90 times more likely to contract occupational asthma than any other industrial employees. Following the correct health and safety procedures at all times prevents risks of occupational asthma and is a legal requirement under the Control of Substances Hazardous to Health (CoSHH) regulations 2002.

Virtually all paintshops use paints and lacquers that contain isocyanate hardener, and even water-based paints can contain isocyanates. It is breathing in the paint mist that can cause health problems and continued exposure to isocyanates can cause permanent and severe occupational asthma which necessitates giving up work. Some of the symptoms of occupational asthma include:

- Continually blocked or runny nose
- Continual problems with sore or watery eyes
- Tightness in the chest, which persists out of working hours
- Wheezing and gasping for breath
- Persistent cough

Although paint spraying is the major cause of exposure to isocyanates, it can also occur from cleaning spray guns and paint curing.
PROTECTION AGAINST ISO CYANATES EXPOSURE

Major protective solutions to protect against exposure to isocyanates include:

- Correctly designed spray booths or spraying rooms
- Following the right working procedures
- Using personal protective equipment (PPE)
- Regular risk assessments and checks to ensure all controls are operating correctly

SPRAY BOOTH S AND SPRAYING ROOMS

Paint spray mist emitted by paint spray guns is invisible and quickly spreads throughout entire spray areas. It is not instantly taken away by ventilation but quickly builds up. The amount of time taken by ventilation to remove the paint mist is called the clearance time and, usually, a spray booth will clear in less than five minutes, while a spray room takes 20 minutes or more.

It’s important that clearance times are recorded for spray booths or rooms and it’s possible to do this by filling the area with mist from ‘party fog’ machines and then measuring how long it takes for the ventilation to remove this. Clearance times can vary over a period of time, particularly if the ventilation filter needs changing, so it’s important to test clearance times on a regular basis to work out the worst-case situations. Once you know what the worst-case scenario is, your clearance testing does not need to be so frequent. Clearance tests should be a part of the rigorous examination of the area and testing, which has to be performed at least once in every 14 months.

You should put up a sign at the entrance to your spray booth or spray room displaying the clearance time and the date it was tested, the person who conducted the testing and the date the next test is due to take place.

Spray areas for commercial vehicles (CV) are much larger and you will need an industrial smoke machine to perform the clearance test. If you CV booth has a pit for spraying underneath vehicles you may need to fit a separate extraction or air blowers as these pits create "dead" areas where mist can remain even after the main booth is clear. Smoke testing should be utilised to check how effective clearance is in the pit area.

All spray booths and spray rooms should be operated at air pressures which are slightly lower than surrounding areas to prevent paint mist from escaping into the rest of the workplace. A visual indication that negative pressure is maintained should be in place, such as a manometer and this should be checked on a daily basis.
PERSONAL PROTECTIVE EQUIPMENT (PPE)

Anybody working or present in the spray booth or spray room should wear air-fed breathing apparatus (BA) at all times when spraying, spray gun cleaning and clearance procedures are in process. Workers should be issued with visor-type, air-fed BA with a lowflow indicator, or a half-mask BA (with constant airflow supply) when any isocyanate-based products are being sprayed.

Every user of BA PPE should be properly trained in its use, the way it should be looked after and tests to perform prior to use to ensure it is working correctly. Uncontaminated air should be supplied to the BA in quantities which are sufficient to protect the user.

If there is any risk of paint splashing, users should wear overalls and gloves, such as disposable nitrile gloves along with chemical protective goggles. PPE should not be stored in any location where it could become contaminated.

WORKING PROCEDURES

Workers should be trained not to raise their visors after the spraying process as invisible paint mist is still in the work environment, so they could be exposed to significant levels of isocyanates.

Users should be informed of the correct procedure for safely leaving the spray booth or spray room during clearance times. This entails:

- Wearing air-fed BA throughout the procedure of walking to the exit door, meaning air hoses should be of sufficient length with connection points located by the exit door
- The worker should open the exit door, unplug the airline and hang it up on the inside of the room next to the door
- After stepping outside the room and shutting the door the worker can remove the air-fed BA

Extraction for gun-cleaning machines that create mist should be provided.
It is important to check all controls are working correctly, including the following:

- Spray booths and spray rooms should be thoroughly examined at least once every 14 months, by a competent person and this examination should include smoke and air velocity tests

- All air-fed BA should be examined on a regular basis to ensure they meet manufacturer specifications

- All maintenance records should be kept for a minimum of five years

**MONITORING EXPOSURE**

Urine testing should be carried out on all spray paint workers and any other employees who could potentially be exposed to isocyanates at least once a year. A sample should be taken from new employees during the first couple of months of employment to use as a control. Where test results are above the biological monitoring guidance values this is an indication of the failure of exposure controls and should be investigated further, with repeat samples taking place.

**HEALTH SURVEILLANCE**

All paint sprayers should be provided with regular health surveillance measures which should include:

- All new employees should be complete a pre-exposure questionnaire and have lung function tests prior to starting working with isocyanates. These tests should be repeated after six weeks and then after working in the job for six months.

- Annual lung-function testing should take place with the provision of a questionnaire for added information

- Skin checks should be given to check for dermatitis

It is a requirement for employers to report any confirmed cases of occupational asthma or dermatitis caused by the use of isocyanates in the workplace under The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR).