

Using air-fed breathing apparatus (BA)

94 Using air-fed BA is mandatory when spraying isocyanate-based products (see Figure 18). Isocyanate paint mist is tasteless and odourless and filtering face masks can fail to protect without warning. Ideally, you should use visor-type, air-fed BA (certified to BS EN 1835:2000). It should be Class LDH3 and include a low-flow indicator (which may be visual or audible). Visibility through the full-face mask can be improved by using tear-off visor protectors and by ensuring adequate levels of lighting.

Figure 18 Use only air-fed breathing apparatus when spraying isocyanate paints



95 Half-mask BA (with constant airflow supply) conforming to BS EN 139:1995, or to Class LDM 2 of BS EN 12419:1999, has also proved to be effective and does not need to be removed to see the quality of the work. Half-mask BA should be face-fit tested. You may also find it beneficial to have a separate visor or goggles, to protect against paint splashes.

96 All BA users should be trained in wearing it, looking after it and testing that it works properly every time.

97 The breathing air supplied to the BA should be uncontaminated and in a quantity sufficient to provide adequate protection of the user. The manufacturer's instruction manual for visor-type devices should specify 'minimum flow conditions' in terms of tubing length and internal bore and air pressure. The standards for half-mask, air-fed devices specify a minimum airflow rate of 120 l/min and, if adjustable, a maximum airflow rate of at least 300 l/min. The low-flow warning device (see paragraph 94) should be designed so that it immediately lets the wearer know if the apparatus is not supplying the manufacturer's minimum design flow rate.

98 The COSHH Approved Code of Practice⁶ suggests that air supplied to BA should be tested at least every three months to make sure it meets the standards laid out in BS 4275:1997. It may be possible to collect supporting information (eg previous air quality test results and comprehensive maintenance logs) that would provide enough confidence in air quality to extend the period of inspection to six months or, at most, yearly.

Checking that the controls are working properly

99 Ensure that COSHH control measures such as plant or equipment (including engineering controls and PPE) are maintained in an efficient state, in efficient working order, in good repair and in a clean condition (COSHH regulation 9), and suitable records are kept for at least five years.

100 In addition to regular maintenance and checks, spray booths and rooms require a statutory 'thorough examination and test' by a competent person at least once every 14 months. This should include air velocity movements and smoke tests for clearance and leakage. The examiner should attach a label to the spray booth or room stating when it was tested and examined, by whom, and when it should be re-tested. If the booth or room fails the examination and test (eg paint mist leaks from the enclosure), the examiner should attach a red label stating the fault.

101 Train someone to examine all air-fed BA once a month, in accordance with the manufacturer's recommendations. Again, keep suitable records.

Biological monitoring

102 Control of exposure to isocyanate in paint mist requires a combination of measures including:

- using the right spray gun;
- containment and extraction of paint mist;
- use of air-fed BA with a clean air supply;
- keeping the visor in place during the clearance time etc.

103 Employers have a legal duty to ensure adequate control. But protection requires the continued effectiveness of this combination of mechanical provisions (which can deteriorate) and operator behaviour (which can be inconsistent). Biological monitoring checks the effectiveness of all the protective measures in one go, by measuring diamine (converted from isocyanate in the body) in the sprayer's urine. Evidence from MVR bodyshops shows that when controls work correctly, exposure is prevented and measurements cannot detect any diamine.

104 Biological monitoring has some limitations:

- Diamine is washed out of the body within hours so it is important to collect the urine sample straight after spraying has finished. Biological monitoring indicates whether exposure to isocyanates occurred. The organisation responsible for managing the tests should explain the results, so you can take remedial action, if necessary.
- Diamine in urine does not tell you how someone was exposed – only that exposure occurred. In most cases, you should be able to spot what is going wrong and improve control measures. Take repeat samples after making changes to show the results are 'clear'.

105 COSHH requires monitoring of exposure when there is a suitable procedure, and it is not obvious from another method of evaluation that exposure is being adequately controlled. Biological monitoring provides a suitable procedure and is currently the most practical method of monitoring control of personal exposure from isocyanate spraying. Biological monitoring is **not** health surveillance.

106 Carry out biological monitoring during the first few months of employment to show that RPE and working practices are sufficient to control isocyanate exposure. It is good practice thereafter to have urine samples for spray painters monitored once a year, and more often if you use half-mask air-fed BA in spray rooms. Further information on biological monitoring can be found in *Biological monitoring in the workplace*,⁹ and in COSHH essentials sheet *Urine sampling for isocyanate exposure measurement*.¹⁰

Health surveillance

107 Given the historically large numbers of bodyshop workers who have developed asthma, 'high-level' health surveillance has been required (under COSHH regulation 11) for all those potentially exposed – usually the paint sprayers. It should

be provided by a competent person, for instance an occupational health nurse or a medical practitioner or other suitable provider familiar with the risks of working with isocyanates and experienced in assessing early signs of occupational asthma.

108 Normally, health surveillance includes annual lung function testing by spirometry and a questionnaire. For new employees it should be carried out on beginning work that may cause exposure: after six weeks; 12 weeks; and then annually. See COSHH essentials sheet *Health surveillance for occupational asthma*.¹¹ If a bodyshop is well managed and can show (for example by biological monitoring) that isocyanate exposure is consistently well controlled, then 'low-level' respiratory health surveillance (eg using questionnaires) may be all that is required.

109 Health surveillance (skin checks) for dermatitis will normally be appropriate for body preparation workers and paint sprayers (see paragraphs 397-407).

Small and Medium Area Repair Technique (SMART)

110 'SMART' work involves repairs to minor vehicle damage such as dents, chips, scratches and tears to the panels, bumpers, wheel arches, alloy wheels, interior trim and windscreens. Many substances used are hazardous but the small quantities and application methods mean that simple precautions, such as avoiding skin contact and ensuring adequate ventilation (fresh air), are normally sufficient. However, paint spraying is more hazardous and guidance on the necessary precautions is given below.

111 SMART spraying means spray application of a surface coating to parts of motor vehicles, usually outside a spray booth or spray room. The parts coated, as part of a repair, should not normally extend to a complete panel or panels.

112 Typically, spraying is either with a mini-jet spray gun (see Figure 19) or airbrush, eg inlet pressure up to 2 bar, an airflow less than 150 l/min and fluid flow below 100 g/min, or a pre-packaged aerosol spray can.

113 Paints dry naturally by solvent evaporation or cure by UV light, chemical hardener, or other means. The quantity of paint

sprayed is unlikely to exceed 25 ml per coat and spray time is unlikely to exceed one minute per coat, though the spray job may take a few minutes.

114 SMART spraying coatings can be classified as 'reactive' or 'conventional'. Reactive coatings include one-pack products and two-pack products that require mixing before use. They can be solvent-based or water-based.

115 Many products are flammable or highly flammable and need safe storage. The small quantities used in SMART spraying mean that any fire risk during application is likely to lie within 15 cm of the sprayer nozzle.



Figure 19 SMART spraying with a mini-jet gun