Welcome

The 3M Guide to Bodyshop PPE contains straight forward advice to help employers and employees understand where, when and how to use PPE in the bodyshop.

It also contains useful background information on legislation, sample HSE inspector checklists, PPE selection guidelines, and a few other pieces of information we thought might come in handy.

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This document is produced by 3M for guidance only. As with any guide, it cannot cover every eventuality and must not, therefore, be seen as an authoritative interpretation of the law. If you have any questions or concerns about personal protective equipment or health and safety matters, it is essential that you seek appropriate expert advice. This guide is believed to be accurate as at October 2007 but does not take account of any changes in legislation, regulations or guidance issued after that date.
Section 1
Legislation: The Fundamentals
Employer Duties

The Health and Safety at Work etc Act 1974, also referred to as HASAW or HSW, is the primary piece of legislation covering occupational health and safety in the United Kingdom. The Health and Safety Executive (HSE) is responsible for enforcing the Act and a number of other Acts and Statutory Instruments relevant to the working environment.

The HASAW places a general duty on employers so far as is reasonably practicable, to ensure the health, safety and welfare at work of their employees and others who may be affected by their work activities.

Examples of Regulations that the HSE enforce in your type of industry are:

**The Management of Health and Safety at Work Regulations 1999** require employers to assess the risks to employees and other who may be affected by their undertaking.

**The Control of Substances Hazardous to Health Regulations 2002** (as amended). Employers are required to prevent or control exposure to hazardous substances at work.

**The Control of Noise at Work Regulations 2005** requires employers to take action to prevent or reduce risks to health and safety from exposure to noise at work.

### Summary of Employer’s Duties:

1. Conduct Risk Assessment
2. Where appropriate, provide PPE which is suitable for purpose
3. Provide training on correct usage and maintenance
4. Supervise correct usage

Employee Duties

Under the HASAW the employees (and self-employed) are required to take reasonable care of their own safety and that of other people who may be affected by their actions. They are also required to co-operate with their employer to enable legal obligations to be met. For example employees must:

- Follow training on correct PPE usage
- Adhere to company procedures
- Obey instructions
- Report any loss or defect with PPE
Enforcement

The HSE are responsible for ensuring that Motor Vehicle Repair premises comply with Health and Safety Law. In addition to carrying out routine inspection visits the HSE also responds to accident and illness reports and whistle-blowers. Notices are issued to bodyshops and individuals for breaches of health and safety law.

1. Improvement notice: The recipients are required to make improvements over a given time period.

2. Prohibition notice: The prohibition notice normally requires the recipient to stop the activity immediately. The work must not be resumed until action has been taken to remove or control the risk. Failure to do this may lead to prosecution. Once the notice has been complied with and the inspector is satisfied then the notice will be withdrawn.

3. Prosecution: Non-compliance may lead to prosecution (Inspectors follow HSE's enforcement policy to decide on the most appropriate action to take).

There have been increasing numbers of improvement notices issued to bodyshops for poor health surveillance and failure to provide suitable PPE.

These notices cannot be ignored as failure to make improvements can lead to prosecution.

Notices

Examples of Notices issued in 2007 include:

- Spraying isocyanates based paints without suitable and sufficient control measures (unfiltered extraction, spraying outside the booth)
- Failure to use adequate and suitable respiratory protective equipment whilst spraying isocyanate based paints (supplied air breathing apparatus)
- Failure to carry out adequate health surveillance (lung function tests)

A bodyshop was fined £15,000 for failure to comply with a prohibition notice on spraying isocyanates in an uncontrolled environment. An additional cost of £1,203 was awarded to the HSE.

I am going to fine you £15,000, I hope you can repair the damage!
1. Risk Assessment

Every bodyshop is different and will be at risk from different hazards according to the type of work that is carried out. To comply with the law, the level of risk assessment carried out and the controls put in place will have to be adequate for protecting your workforce.

5 Steps to Risk Assessment

The HSE propose “5 Steps to Risk Assessment” (refer to www.hse.gov.uk for more information)

1. Identify the hazards:
   - Check manufacturers’ instructions or data sheets for chemical content, health effects and recommended personal protective equipment

Material Safety Data Sheets (MSDS) contain a wealth of information for example:

2. Hazard Identification

R36/37/38 Irritating to eyes, respiratory system and skin
CYNADOCYRILATE, DANGER: Bonds skin and eyes in seconds

3. Composition/Information on Ingredients

Ingredient name and classification:
Ethyl 2-cyanoacrylate
CAS number: 7085-85-0
Percentage: 80 - 100

2. PPE Selection

Personal Protective Equipment (PPE) shouldn’t automatically be regarded as the best solution to protecting your workforce. Often by controlling the hazard at source you may be able to reduce the need for PPE all together (see right).

One example is to consider the use of supplied air respiratory protective equipment. Only the sprayer who is wearing the air-fed equipment is protected from isocyanates. Unless the paint spraying is strictly confined to a booth with adequate air flow and filtration other operatives may be exposed to the hazard.

Even with prevention methods and controls in place it may not be enough to reduce the level of hazards below the workplace exposure limit and hence PPE may be required.

Steps to PPE Selection

1. What are the hazards?
   - It is not enough to simply identify that there is a respiratory hazard. When selecting respiratory protective equipment it is important to understand the properties of the airborne hazard. Likewise eye protection suitable for chemical resistance may not withstand impact from high speed particles.

2. What controls are already in place?
   - Supplied air respiratory protection provided and worn by spray operators
   - Booth extraction cleaned and checked regularly

3. What further action is necessary?
   - Carry out biological monitoring on paint sprayers
   - Operatives to measure isocyanate exposure

4. Action by whom?
   - Jon Smith to organise testing for all operatives

5. Action by when?
   - 30/9/2007
   - 20/9/2007

Completed 20/9/2007

What are the hazards?
- Inhalation of hazardous substances
- Paint spraying

Area of body affected
- Skin
- Head and feet
- Lungs
- Skin

Example
- Materials: Paints, solvents, isocyanates
- Splashes and sprays
- Noise from machinery
- Sources of injury: Falls, cuts, and punctures
- Chemical agents: Acids, bases, solvents

PPE
- Respiratory protection
- Eye protection
- Ear protection
- Hand protection
- Foot protection

Reduce the Risk: Hierarchy of Control

1. Elimination
   - Can the process be modified to eliminate the hazard?

2. Substitution
   - Can the process/product be substituted for something less toxic?

3. Separation
   - Can you totally enclose the process?

4. PPE
   - This should be the last option. Protects the individual not the workplace

5. Personal Protective Equipment (PPE)
2. How can they harm the wearer?

There are several routes of entry which hazards can take into the body. It is likely that more than one item of PPE will be required when there are different hazards present.

- Particulates can irritate the nose and throat
- Excessive noise may lead to tinnitus, hearing impairment or other conditions
- Welding/metal fumes can cause lung damage and metal fume fever
- Particulates can penetrate into the lungs and cause tissue damage
- Gases and vapours once inhaled can be absorbed into the bloodstream and cause irreparable organ damage
- Solvents can enter the bloodstream through the skin and cause severe organ damage
- Inhaling noxious gases can cause occupational asthma
- Impact of flying particles can damage the eyes
- Particulates can irritate the skin

Particulates = dusts, fibres and mists

How much of the hazards are the workers exposed to?

- How long are they exposed for?
- How high is the concentration?
- How much of the hazards are the workers exposed to?

Selection Guidance:

When selecting PPE consider the following:

Select quality products which are CE marked in accordance with the PPE regulations (2002)

- Employers are required to select PPE that has been approved to certain standards, demonstrating that the product has undergone testing and meets the basic safety requirements for the user.

Select products which provide adequate protection

- Different classes of PPE are generally available to match different severities of hazards. Respirators have different protection factors, for example FFP1 disposable respirators have a lower protection factor than FFP3 products. Therefore, FFP1 respirators are generally selected when the dust hazard is of low toxicity and/or low concentration and FFP3 respirators are used in more hazardous atmospheres where a higher level of reduction in exposure is required. Ensure that the level of protection selected is appropriate to the task.

Select products which are suitable for the job

- For most applications there are a number of different types of PPE which are suitable. Question whether the product selected is suitable given the conditions it will be used in. In other words will the product deform, melt or fail?

Select products which are suitable for the wearer

- One type of PPE may not be suitable for everyone. For example workers with facial hair and injuries or wearers of prescription glasses may require different PPE.

- It is important to get the wearer to trial the product first to make sure that it fits and is comfortable. (Refer to section on Fit Testing)

- Ensure that the wearer can perform their job properly in the PPE selected e.g. can they communicate effectively and do they have the dexterity and mobility required.

Select products which are compatible with other PPE

- Ensure that if more than one item of PPE is worn that they can be used together without compromising on protection levels or increasing discomfort
- For example: Respirators worn by welders to protect themselves from welding fumes will need to fit comfortably underneath their shield.

Ensure that there are procedures in place to carry out the maintenance of PPE

- For example: Maintenance record cards, availability of replacement and spare parts

Ensure that adequate provision is made for the cleaning and storage of reusable PPE after use

- For example storage lockers for supplied air respirators.
- All PPE should be stored in a clean uncontaminated area.

Application | Hazard | Advisory PPE | Unsuitable PPE | Suggested Products
--- | --- | --- | --- | ---
Dry Sanding and Grinding | Inhalation of dusts (and other particulates) | Particulate Respirator | Nuisance dust mask | Disposable Respirator (06922)
Foldable FFP2 Disposable Respirator (06923) | | Premium Line Goggles (2790) | | Acetate lens goggles (machine use)
Impact resistant goggles (hand sanding only) | | | | Classic Line spectacles (2720) or Comfort Line spectacles (2740)
Welding | Inhalation of welding fumes and ozone gas | Welding Fume Respirator (06920) | Nuisance dust mask | Particulate Respirator with carbon layer
| | | | | Welding helmet
| | | | | Speedglas™ SL Welding Shield

Bodyshop Selection Guide
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<th>Application</th>
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<th>Advisory PPE</th>
<th>Suggested Products</th>
<th>Unsuitable PPE</th>
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<tr>
<td><strong>Paint Spraying</strong></td>
<td>Inhalation of isocyanates found in 2-pack paints</td>
<td>Supplied Air Breathing Apparatus</td>
<td>Provided: Air Purifier System (3M™, VostAir™)</td>
<td>Particulate respirator (e.g. 6922) and Gas and vapour respirator (e.g. 6948)</td>
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<td></td>
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<td></td>
<td>7500 Series Half Face Mask with 06971 Supplied Air System (must be used with eye protection, e.g. goggles)</td>
<td>Maintenance Free Respirator (06941 – FFA1P2D) or (06942 – FFA2P3D)</td>
</tr>
<tr>
<td><strong>Degreasing</strong></td>
<td>Inhalation of solvent vapours</td>
<td>Gas and Vapour Respirator</td>
<td>Provided: Gas and Vapour Respirator (3M™, Versaflo™)</td>
<td>Maintenance Free Respirator (06941 – FFA1P2D) or (06942 – FFA2P3D)</td>
</tr>
<tr>
<td><strong>Mixing paint (where there is insufficient ventilation)</strong></td>
<td>Inhalation of solvent vapours</td>
<td>Gas and Vapour Respirator</td>
<td>Provided: Gas and Vapour Respirator (3M™, Versaflo™)</td>
<td>Maintenance Free Respirator (06941 – FFA1P2D) or (06942 – FFA2P3D)</td>
</tr>
<tr>
<td></td>
<td>Eye irritation from vapours and chemical splash</td>
<td>Chemical resistant goggles</td>
<td>Provided: Premium Line Goggles (2790A) Acetate lens</td>
<td>Premium Line Goggles (27900A) Acetate lens</td>
</tr>
</tbody>
</table>

**Adhesives, Coatings and Sealers**

- Inhalation of mist (low concentration) and nuisance level** vapour
  - Particulate Respirator with nuisance level protection
  - Suggested Products: Disposable Speciality Respirator (6998 - Unvalved)
  - Maintenance Free Respirator (06941 – FFA1P2D) or (06942 – FFA2P3D)

- Inhalation of vapours and mists (higher concentrations)
  - Particulate, Gas and Vapour Respirator
  - Suggested Products: Disposable Speciality Respirator (6998 - Unvalved)
  - Maintenance Free Respirator (06941 – FFA1P2D) or (06942 – FFA2P3D)

- Eye irritation from vapours and chemical splash
  - Chemical resistant goggles
  - Suggested Products: Disposable Speciality Respirator (6998 - Unvalved)
  - Premium Line Goggles (06942 - Flat)

**Polishing and Compounding**

- Inhalation of dust (Where vapour/odour is present refer to solutions for adhesives, coatings and sealers above)
  - Particulate Respirator
  - Suggested Products: Foldable FFP2 Disposable Respirator (06923)
  - Disposal FFP2 Disposable Respirator (06921)

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*This guide is only an outline. It is designed to help focus on the most appropriate products in the 3M range for various applications and hazards. It should not be used as the only means of selecting a product. Details of performance and limitations are set out in the product packaging and user instructions. It is ultimately the responsibility of the employer to select the most appropriate PPE based on a full risk assessment.*

**Nuisance level = below Workplace Exposure Limit**
Fit Testing

What is fit testing?
Fit testing checks that a respirator provides an adequate seal to the wearer’s face.

Why is it necessary?
Fit testing is an important step in the process of deciding whether a respirator with a tight fitting facepiece is suitable for purpose. Fit testing is required by the Approved Code of Practice of the COSHH regulations and is industry wide requirement.

What products need to be fit tested?
Fit testing needs to be carried out on all wearers of respirators with tight fitting facepieces where testing has not been carried out before.

Examples of respirators for which fit testing are required:

- 3M™ 7500 Reusable Half Mask
- 3M™ Disposable Respirator 6923
- 7500 3M™ 7500 Reusable Half Mask

When is fit testing required?
- On initial selection of respiratory protection
- It should be repeated at appropriate times for example if the wearer’s face shape changes due to weight loss or gain, or facial surgery

How is fit testing carried out?
There are two types of fit testing generally used:
- Qualitative test using a taste test method
- Quantitative test using a particle counting device

Qualitative
What is this type of testing suitable for?
- Disposable respirators
- Half face masks

Not suitable for:
- Full face masks

3M Fit Test Kits
3M offer two fit test kits FT10 (Sweet) and FT30 (Bitter). Each kit contains a hood and collar assembly, two nebulisers, sensitivity solution, test solution and detailed user instructions. A training CD is also included which features a step-by-step video demonstration of how to use the kit.

The test relies on the wearer’s response to the taste of a test agent. The quality of the seal to the face is assessed while the wearer performs a series of head movements, talking and breathing exercises.

All of the respirators listed as requiring fit testing must only be used by clean shaven wearers.

These kits are generally purchased and used by employers wishing to carry out fit testing “in-house”.

Quantitative
What is this type of testing suitable for?
- All types of respirators incorporating a tight fitting facepiece including full face masks

Quantitative fit testing using a particle counting device is generally undertaken by a consultant visiting the workplace. The TSI Portacount device is used to assess the quality of the respirator’s seal to the face while the wearer performs a series of head movements, talking and breathing exercises. The Portacount reports a numerical result called a fit factor. The HSE specify the minimum fit factor required depending on the type of respirator used.

3. PPE Training

Suitable PPE may have been selected but to ensure that the desired level of protection is provided it is important that the wearer uses the product as intended.

Awareness
To encourage operatives to wear PPE it is important that they fully understand the reasons why they are required to wear protection. Wearing should be provided information on the following:

- What the hazards are
- What the associated risks are with each application
- What the health effects are

Using PPE Correctly
Inform wearers of how to:

- Make sure all gaskets are properly seated
- Examine all plastic parts for signs of cracking or fatigue
- Ensure that any head straps are intact and undamaged

Typical Inspection of Respirators
- Check the face piece for cracks, tears and dirt. Be certain that the face piece, especially the face seal area is not distorted.
- Examine the valves for signs of dirt, distortion, cracking or tearing.
- Ensure that any head straps are intact and undamaged
- Examine all plastic parts for signs of cracking or fatigue
- Make sure all gaskets are properly seated
- For supplied air equipment the input pressure and condition of supply tube a couplings should be check. Visors should be checked for damage and changed if necessary.

Cleaning
- Clean and disinfect the face piece after each use or at the end of each shift. Clean with either a damp cloth or a face seal wipe.

Maintenance
Maintenance is required to ensure that PPE continues to provide the level of protection for which it was designed.

COSHH requires that equipment is inspected, tested and maintained in accordance with the manufacturer’s instructions for use and HSE guidance.

Maintenance procedures

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<td>Visual inspection</td>
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<td>Post-shift check</td>
<td>Clean and inspect</td>
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<tr>
<td>Monthly check</td>
<td>Maintenance records must be kept</td>
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</table>
Breathable Air Quality Testing

**Why is testing necessary?**

**Legislation:**
COSHH requires that air supplied to a breathing apparatus should be tested at least every three months to ensure that it meets the standard for air purity as laid out in EN 12021.

**Health Consequences:**
Air delivered through a compressor system to outlets in the booth can be affected by a number of contaminants:

- Oil
- Water
- Carbon monoxide
- Carbon dioxide
- Other contaminants specific to the bodyshop

**How is Air Quality Testing Carried Out?**

3M offer a ‘Breathable Air Quality Service’ which provides:

- A briefing where required, on the test procedure
- Testing of the breathable air for oxygen levels and contaminants e.g. water, oil, carbon monoxide and carbon dioxide
- Flow tests to ensure that the air is supplied at the required pressure and flow rates
- Advice on suggested actions in the result of a failure
- Written set of test results
- Automatic notification for re-test as per your requirement.

For further information about this service please contact our Safety Service Co-ordinator on 0161 237 6278.

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**Maintenance and Servicing**
- Change particle filters as soon as increased breathing resistance occurs, that is when it becomes harder to inhale and exhale.

- If items need to be replaced only use the spare parts as recommended by the manufacturer.

- The volume flow and quality of air (refer to section on breathable air quality testing) should be tested at least every 3 months (supplied-air only).

**Record Keeping**
To comply with CoSHH regulations maintenance records should include details of:

- Details of employer responsible for provision of equipment (e.g. Bodyshop manager)
- Details of person carrying out the inspection
- Equipment details including manufacturer and product numbers
- Condition of the equipment and details of any defects

**Storage**
- Store equipment somewhere which is clean, safe and dry and away from sources of contamination. For example in a storage container such as a locker or sealed bag.
- Filters have a limited shelf life. It is important to note the expiry dates.

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**Section 3**

**Bodyshop Applications**
Health Effects

Isocyanates (commonly found in two-pack paints) are the most common cause of occupational asthma. HSE statistics show that vehicle paint sprayers are approximately 80 times more likely of contracting occupational asthma than the average for the UK working population.

Ovalitional Asthma

Research conducted by the British Occupational Health Research Foundation (BOHRF) found that approximately one third of patients are unemployed up to 6 years after diagnosis. There is good evidence that early detection and removal from exposure improves prognosis (ref 1).

Symptoms Include:

- Recurring soreness or watering of eyes
- Recurring blocked or running nose
- Bouts of coughing
- Chest tightness, wheezing or breathlessness
- Any other persistent history of chest problems
- Symptoms improve at weekends or during holidays

Individuals diagnosed with occupational asthma may have no choice but to leave employment which may lead to a substantial loss of income.

PPE Selection

A supplied air full face mask or visor is the preferred choice of protection for paint spraying as it provides complete facial protection. However where direct vision is considered essential a supplied air half mask with suitable goggles may also be used. Note however that if a half mask is used biological monitoring must be undertaken to ensure that the system is providing adequate levels of protection.

What is not suitable protection?

Any type of filtering device (see right).

Isocyanate Myths...

“Many paint sprayers believe that a significant or even the main route of isocyanate paint spray is through the skin, with the ‘thin skin around the eyes’ being a particular concern. These views are confusing and wrong.

The overwhelming route of entry for isocyanate mist in bodyshops is through inhalation of fine airborne paint mist. Getting mixed paint onto the hands can cause dermatitis but this is a different issue.”

Source: HSE Reducing Ill Health in the Motor Vehicle Repair Industry — Top p.21

Paint Spraying

This is a copy of the checklist used by HSE staff on visiting premises spraying isocyanate-based paints. Ensure that you are prepared for an unexpected visit:

Questions you need to ask | Yes | No | Additional Comments
--- | --- | --- | ---
Are the sprayers aware that they use isocyanate-based paints? (Note alternative terms such as 2-pack, 2K, aliphatic, polyisocyanate, blocked isocyanate, polyurethane, etc) | | |  
Do they know that isocyanates can cause severe occupational asthma and what the warning signs and symptoms are? | | |  
Is spraying isocyanate-based paints limited to an extracted room or spray booth? | | |  
Has the booth or room extraction system been thoroughly examined and tested in the last 14 months? (Check paperwork) | |  
Does the booth/room have a pressure gauge to show it is under negative pressure? | | |  
Is the paint mist filtered and discharged safely outside? | | |  
Are filters blocked or missing? | | |  
Is the clearance time of the booth or room known and on display? | | |  
Is airline breathing apparatus (BA) always used whenever spraying isocyanate-based paints? | | |  
Is the BA maintained adequately? (Inspect the equipment) | | |  
Is gun cleaning carried out using extracted or enclosed gun-washing equipment in open workshop (or in booth/ventilated mixing room with normal controls and BA) | | |  
Are the sprayers having annual health checks for breathing? | | |  
Has a ‘responsible person’ been appointed to carry out skin checks? | | |  
Is the isocyanate exposure of the sprayers measured annually using urine tests? | | |  

PPE typically used when paint spraying:

Full face mask (6000 series)  
Supplied air system

Acetate lens goggles  
Half Face mask (7500 series)  
Supplied air system

Supplied Air Visor System (3M™ VisionAir™)

All systems require approved Compressed Air Supply Tube (CAST) and couplings.

Items unsuitable for paint spraying:

Don’t lift the visor to inspect the paint job

Gas and Vapour Respirator  
FFP2 Particulate Respirator

3M offers a range of supplied air breathing apparatus, including the traditional style visor as well as full face and half face masks.
Clearance Time

Why is clearance time important?
It is important that sprayers appreciate that fine paint mist remains in the booth for some time after the painter has finished spraying. This mist may not be visible to the eye however it contains high concentrations of isocyanate. The sprayer must not lift his visor until the booth has had time to clear; hence it’s important to measure clearance time.

If visibility is an issue and the sprayer insists on inspecting his paintwork after spraying then a supplied air half mask can be used.

Measuring booth clearance time:
A party fog or smoke machine can be used to measure the time it takes for the booth to clear. This should be tested regularly and included as part of the booth maintenance checks.

A summary of the guidance published by the HSL:

1. Test in an empty booth and ensure that the extraction system is turned off
2. Fill the room with smoke, making sure to distribute smoke evenly throughout the room
3. Switch on the ventilation system and start a timer
4. Check for any leaking air around the booth exterior
5. Note the time at which the room is judged to be clear of smoke
6. Display time on a notice on the door or entrance of the booth and inform all employees

Note: Appropriate RPE should be worn during the clearance time measurement to provide protection from the smoke.

Biological Monitoring

Are the control measures providing adequate protection?
Biological monitoring involves measuring for isocyanate breakdown products in a sample of workers’ urine. This will indicate if they have been exposed to isocyanate. If they have, the controls (e.g. spray booth, respiratory protective equipment) are not working properly, or are not being used correctly.

What specialist help do I need?
Laboratories such as the Health and Safety Laboratory (HSL) offer a commercial, confidential service to measure isocyanate breakdown products in urine. Typically laboratories charge an amount per sample, including a kit for collection the sample, packing and instructions.

Information Sources

3M
www.3m.com/uk/ohes
www.3mbodyshop.co.uk

Health and Safety Executive (HSE)
Health and Safety in the Motor Vehicle Repair Industry
www.HSE.gov.uk/mvr

Health and Safety Laboratory (HSL)
www.hsl.gov.uk

COSHH
Steps to control health risk from chemicals
www.coshh-essentials.org.uk

Ref 1
Article from www.occupationalasthma.com