SPRAY PAINTING
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Spray painting refers to the process by which a liquid coating substance, such as paint, is converted into a mist or aerosol in order to apply a coating onto an object or surface. This process is widely used in the automotive, aircraft, furniture, metal fabrication, and building and construction industries. Its hazards include exposure to hazardous substances contained in paints, fire, explosion, noise and manual handling.

Health and safety can be affected by exposure to substances through inhalation of vapours, injection of paint and by skin contact. The health effects are significant as both short and long term illnesses and diseases may result. In addition, serious injuries may occur from fire and explosion arising from the spraying process.

What is this booklet all about?
This booklet aims to assist you to take action to prevent spray painting related injury or illness in your workplace. If you follow the advice set out here, you will be well on the way to complying with your legal obligations to control workplace risks arising from spray painting. This guidance should be read in conjunction with OHS Regulation 2001.

Who is this booklet for?
This booklet is for employers, managers, OHS representatives, OHS committee members, employees, unions and employer organisations who need to know about spray painting work.

When to use the information?
If your workplace activities already include spray painting, this guide should be used to assess the adequacy of your current spray painting health and safety practices. If you have not looked at your spray painting health and safety practices in the last six months, then check them now.

If you are setting up a new business, this booklet should be your step by step guide to determining your requirements for managing work involving spray painting.

The information in this booklet should be used when consulting with employees about the hazards of spray painting. The OHS Act 2000 requires employers to consult with employees and take into account their views when making decisions that affect their health, safety and welfare. Involving your employees in identifying hazards and solving health and safety problems is an essential step in making your workplace safe and healthy.

If you would like more detailed information on spray painting it is recommended you read the National Guidance Material For Spray Painting publication produced by the National Occupational Health and Safety Commission. The publication is available from the Commission’s web site http://www.nohsc.gov.au
OHS Regulation 2001 sets out certain minimum standards for spray painting however no two workplaces are exactly the same. Your program to manage spray painting at work will depend upon your industry and the specific activities your operations require. To determine the action you should take, you must follow three basic steps:

1. **Look for the hazards in your workplace** – the things that can cause harm (eg. solvents, two pack paints, epoxies, resins, ignition sources, spray equipment). OHS Regulation 2001 calls this identifying the hazard.

2. **Work out how serious your health and safety problems might be.** Decide who might be in danger (eg. you, employees, customers), the factors contributing to the risk, what injuries or impact on health and safety could result (eg. allergic contact dermatitis, occupational asthma, MSDS data), and how likely this is to occur. This is what the OHS Regulation 2001 calls assessing the risk.

3. **Eliminate or control hazards by making changes that protect people.** For example, always use a spray booth, substitute a hazardous substance with a less dangerous one, install appropriate exhaust ventilation, develop agreed safety procedures, and always use personal protective equipment to support other control measures. The OHS Regulation 2001 calls this eliminating or controlling the risk.

You must follow these steps for every health and safety issue that requires attention. For work involving spray painting, this method helps you to work out what action will most effectively safeguard employees.

Looking for hazards is the first step and to get you started the Common Spray Painting Hazards Tool on page 4 outlines some of the hazards we know can cause problems:
## Common spray painting hazards tool

<table>
<thead>
<tr>
<th>HAZARD</th>
<th>TYPICAL PROBLEMS</th>
<th>TYPICAL SYMPTOMS/INJURY/ILLNESS/DISEASE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous substances</td>
<td>Exposure to hazardous substances (eg. paints, solvents, dusts, powders, resins) because of poor ventilation, faulty equipment, poorly designed spray zones or use in a confined space.</td>
<td>Short term effects such as nausea, skin irritation and rashes; long term illnesses like occupational asthma, lung cancer and sensitisation (in effect becoming allergic to the paint).</td>
</tr>
<tr>
<td>Fire and explosion</td>
<td>Spray painting mists containing flammable substances ignited by heat sources like sparks from inappropriate electrical equipment or hot surfaces.</td>
<td>Shock, burns, loss of consciousness, death.</td>
</tr>
<tr>
<td>Electricity</td>
<td>Contact with electrical current when undertaking wet work.</td>
<td>Shock, burns, loss of consciousness, death.</td>
</tr>
<tr>
<td>Plant</td>
<td>Malfunction of ventilation, electric shock.</td>
<td>Respiratory disease, burns, electrocution.</td>
</tr>
<tr>
<td>Manual handling</td>
<td>Holding a heavy spray painting gun above shoulder height for extended periods; awkward twisting or bending to spray object; moving the item being sprayed; handling large paint drums.</td>
<td>Sprains, strains, fractures.</td>
</tr>
<tr>
<td>Noise</td>
<td>Noise from pumps, motors or compressed air spraying.</td>
<td>Hearing loss, fatigue.</td>
</tr>
</tbody>
</table>

This Tool is not a comprehensive guide to spray painting hazards. It provides examples of typical problems created by spray painting, and some of the injuries, illnesses and diseases that can result. You may have hazards other than those listed here.

The guidance in this booklet is concentrated on hazardous substances and fire-related hazards.
The hazards associated with spray painting can be identified during three key stages:

- Preparation (overall set up of job, paint and surface preparation, mixing and pouring)
- Use (spray painting operations and work practices)
- Clean up (cleaning, maintenance and storage)

In each of these stages, the things likely to cause most harm to you or your employees are the substances used in the spraying process. Most of the paints, solvents, dusts and powders used commonly in spray painting are classified as hazardous substances.

Hazardous substances must be managed carefully, following the manufacturer’s guidance for use, including precautions that must be taken. In some cases you may be required to keep a check on the health of employees working with particular hazardous substances.

Whilst all the hazards mentioned in the Common Spray Painting Hazards Tool require an assessment to work out how serious a problem they are, managing hazardous substances requires some very specific steps which are outlined below.

Hazardous substances can be identified by their labels and Material Safety Data Sheets (known commonly as MSDS). The MSDS will provide information about a substance, including:

- a statement that the substance is hazardous;
- chemicals and physical properties of the substance (such as boiling point, solubility in water);
- its ingredients (and their proportions);
- short and long term health effects;
- how the substance can enter the human body (called “routes of entry”):
  - by inhalation (eg. vapours from spraying)
  - by ingestion (eg. unlabelled substance mistakenly consumed)
  - by skin contact or absorption (eg. use of solvents in clean up)
  - by injection (eg. of paint in high pressure spray painting);
- precautions for use and recommended personal protective equipment;
- first aid information;
- exposure standards that set out the airborne concentration of a substance within a person’s breathing zone. These standards might relate to acceptable levels for a period of 8 hours per day over 5 days, or to shorter periods (eg.15 minutes) for substances known to create immediate dangers to health.

The information in the MSDS is vital to safe and healthy spray painting operations. You must have an MSDS for each substance you use. Manufacturers and suppliers must provide this information to the employer, who in turn, must pass it on to all employees who may be exposed to the substance. This information must be kept up to date.

You must establish what substance is being used, and whether it is prohibited for use in spray painting.
Arsenic or its compounds
Benzene (benzol) if the substance contains more than 1% by volume
Methanol (methyl alcohol) if the substance contains more than 1% by volume
Carbon Disulphide (Carbon Bisulphide)
Tetrachloroethane
Tetrachloromethane (Carbon Tetrachloride)

For other hazardous substances, like those used in two pack paints, you must work out how they might affect the health and safety of employees (and others, such as customers or visitors). Understanding how the substance can cause harm allows you to build in ways of preventing exposure to these dangers.

The Preparation assessment factors that you should take into account include:

• **The way the substance could enter the body**
Surface preparation can create dusts that contain hazardous substances such as lead and carbon fibres that could be inhaled by workers. Pouring liquids from one container to another could also release vapours that could be inhaled. Inhalation of vapours and aerosols, injection by high pressure equipment and skin contact are the most likely ways substances used in spray painting can enter the human body. The MSDS provides this information.

• **The health effects of the substance**
The MSDS will provide the basic information about possible short and long term health effects. Isocyanates, commonly found in two pack paints, are skin and eye irritants. Inhaling them can cause respiratory ‘sensitisation’ (asthma-like symptoms). Information from first aid and incident records will help you to identify any problems you might have. Talk to employees about any health problems they may have experienced.

• **Other hazards related to the substance**
Many of the substances used in spray painting are flammable and the risks of fire and explosion need to be considered. Dust generated by sanding or grinding operations may also create health effects, especially respiratory problems.

• **The nature of the work**
Exposure to hazardous substances needs to be considered in relation to different stages in the process:

➤ Preparation such as wet/dry sanding and rust conversion
➤ Mixing of two pack paints, for example, may present a risk of inhalation and skin contact
➤ Colour matching involving spraying could lead to inhalation and skin contact
➤ Spray painting releases aerosols and vapours which present risks to health
➤ Clean up using solvents could result in high level, short term inhalation and skin contact

Working out the risk involved at each stage will depend on the practices you are currently using to minimise exposure. This is explained in more detail later in the booklet.
• **The number of people who could be exposed**
  Consider how many employees are in an area where they could be exposed to hazardous substances through any of the “routes of entry” to the body.

• **How often - and for how long - people are exposed**
  For the typical spray painting jobs you do, work out how often all, or some of your employees, are exposed to hazards. Work out the length of time people are exposed to hazardous substances. The outcome of this assessment factor will also depend on what measures are currently being used to prevent exposure.

These assessment factors must be considered when setting up your spray painting health and safety plan. If you are still unsure about whether the substances you are using create risks, it is recommended that you get expert assistance to monitor the atmosphere where spraying is being done. This will give you a more detailed basis for deciding how to fix identified problems. An occupational hygienist can undertake this atmospheric monitoring.

The assessment of risks in the planning and preparation stage may only need to be done once. If you change the products you use or the work practices involved, or new information becomes available, then you would need to look at it again.

It is the combination of the substances, the jobs they are applied to and the work practices that determines the safeguards you must put in place. You need to look at what you are currently doing to protect employees from hazardous substances. Your Use and Work Practices assessment factors include:

• **The nature of the object being sprayed**
  The size and shape of the object, and the ease of moving it, should be considered. More importantly, the location of the object in relation to the painter and other employees must be looked at. The direction of the stream of ventilating air is critical in assessing risks. Direction of airflow can increase risk where the overspray blows back to the operator or is directed toward other employees.

• **The nature and effectiveness of booths used to isolate people from spray hazards**
  Some workplaces use fully automated spray painting processes, in which objects are fully enclosed in a booth and employees are separated from hazardous substances. Automotive spraying, for example, requires a fully enclosed booth. In most cases a combination of booths and personal protective equipment will be required. The likelihood of exposure is greatest where the enclosure does not effectively isolate the painter, or other employees.

On a building site spray painting may not be practicable in a booth. Measures to protect employees and others in the area must be taken to deal with the potential for exposure.

The adequacy and suitability of an enclosure or spray booth is a technical matter. Specific guidance set out in the Standards Australia document AS/NZS 4114.1 Spray Painting Booths Part 1-Design, Construction and Testing should be considered.
Where spray painting is undertaken outside a booth, a zone must be designed to isolate the activity from other people and from potential sources of ignition. This zone can be both a physical barrier to restrict access or a time period over which concentrations of hazardous substances will break down to an acceptable level. These considerations will depend on the assessment done in the preparation stage.

- **The type of ventilation used to minimise exposure to hazardous substances**

Effective ventilation can reduce the risk of inhalation of substances and reduce contact with skin and eyes. It has the additional benefit of reducing fire and explosion hazards.

A down-draft spray booth is considered the most effective form of ventilation and produces lower levels of overspray. Filtered air enters through the ceiling of the booth and exits through the floor. Fully enclosed, standard wet wall or filter type booths are also highly effective and commonly used.

Local exhaust ventilation draws contaminants into a hood and captures the overspray and vapour as close to the source of spraying as possible. As with spray booths, the design and construction of local exhaust ventilation requires expert advice and Australian Standards AS/NZS 2381.1 Electrical equipment for explosive atmospheres – Selection, installation and maintenance – General requirements and AS 1482 Electrical Equipment for explosive atmospheres – Protection by ventilation – should be consulted.

Dilution ventilation is the displacement of contaminated air by fresh air, and may be achieved by mechanical supply fans or by natural air currents. Again, the design of such ventilation requires reference to advice such as that provided in AS/NZS 2381.1 and AS 1482 to ensure that the most effective extraction of vapours and aerosols is maintained.

- **The type of spray painting undertaken**

There are various techniques which may be used in spray painting. These techniques will vary according to the job and the type of coating used. Each has characteristics that must be understood to undertake work safely.

Conventional compressed air (low pressure) spray painting creates problems with extensive overspray, whilst airless (high pressure) spray painting reduces overspray and requires less solvent in the paint.

Electrostatic spray painting reduces rebound and overspray; however, the ignition of vapours by an electrical discharge is a hazard involved with this process. Earthing and isolation of electrical equipment, and measures to prevent electrostatic build-ups are essential.
Most of the guidance in this booklet is directed towards “wet” rather than “dry” spray painting processes but the specific hazards of a dry process such as powder coating should be noted. Powder coatings whilst free of solvents still need to be checked for hazardous substance properties and the risk control measures outlined above generally apply (ie. use of booths, spray zones, personal protection). Triglycidylisocyanurate (TGIC) powder coatings, for example, should only be used in a booth compliant with Australian Standard AS 3754-1990 – Safe Application of Powder Coatings by Electrostatic Spraying. The minimisation of powder dust in the working area throughout the process, from filling hoppers to clean up stage, can be achieved by applying the controls outlined in the following pages.

- **Spray painting work practices**
  Using the correct equipment and techniques will reduce employee exposure to hazardous substances. Good work practices include:

  - Adjusting the spraying distance to reduce overspray
  - Adjusting spraying pressure to reduce overspray
  - Selecting appropriate spray nozzles to minimise overspray
  - Selecting the best spray method for the job

- **Use of personal protective equipment (PPE)**
  Evidence about common practices in spray painting indicates that poorly chosen PPE, and the inappropriate use of PPE, are factors contributing to greater exposure to hazardous substances.

  PPE is an essential part of reducing risks and must be used as an additional measure to booths. Over-reliance on PPE may be a risk factor that should be assessed when developing reliable ways of limiting exposure to hazardous substances.

  The PPE used should follow the recommendations on the MSDS, and be properly fitted and maintained. Consultation with the PPE supplier can also assist in matching equipment to the spray painting process to be used. Employees must be consulted on the choice of PPE and trained in its correct use.

  The risks associated with spray painting do not cease when a spray job is completed. It is also important to look at potential problems involved in the clean up and maintenance stages.

  Your Clean up and Maintenance stage assessment should consider the following factors:

  - **Labelling of unused or surplus liquid**
    When a substance like paint or thinner is poured from one container to another and is not used immediately, the container must be labelled. The label must include the product name and the ‘risk and safety phrases’ outlined in the MSDS (ie. standard information like ‘flammable’ and ‘keep away from sources of ignition – no smoking’).

    Where there is surplus product not used immediately, it must be returned to a labelled container designated for that substance.
• **Storage of spray painting supplies**

Only the minimum quantity of supplies should be kept in readiness near the spray zone. All other product should be stored in a separate room or storage cabinet. Flammable substances must be kept in tightly closed, clearly labelled containers. Further advice on storage requirements can be found in AS 1940 The Storage and Handling of Flammable and Combustible Liquids.

• **Cleaning and maintenance of spray booths and associated equipment**

Spray guns and associated plant must be regularly cleaned and checked in accordance with manufacturer’s instructions. Hoses and lines conveying flammable liquids also need to be regularly maintained. Employees must be protected in the clean up process to minimise contact with substances.

If not regularly cleaned and maintained, spray booths will gradually become ineffective in providing protection. In addition the build up of dried overspray on surfaces contributes to an increased fire hazard. AS/NZS 4114.2 Spray Painting Booths: Selection, Installation and Maintenance provides guidance on recommended maintenance practices.

Ventilation systems must also be cleaned and maintained and filters and hoses regularly checked.

• **Personal clean up practices**

The use of solvents to clean the hands or body is likely to lead to absorption through the skin: water based cleansers are more appropriate. Cleaning rags saturated with paint or solvent and left in open bins create both an inhalation risk and a fire risk. The use of lidded wet bins is recommended.

The number of factors you need to consider highlights the range of problems spray painting presents, and the many ways in which people can be exposed to hazards, often resulting in harmful health effects.

Having worked out how serious your OHS problems are you must now take action to fix these problems. The more thorough your assessment has been the more options you will have for eliminating or controlling risks. This is because the problems are closely related to each other: this must be kept in mind when you try to fix any one of them.

For example, using poorly adjusted spray equipment will result in more overspray, and potential exposure for the employee. In turn, this will lead to a build up of paint on surfaces and increased risk of fire. In addition, inefficient spraying will raise costs and encourage people to cut corners to meet margins. This vicious cycle can pose a serious threat to the health of employees.
The following options for fixing problems are drawn from the assessment factors set out in the three stages and include:

• **Follow the recommendations on the MSDS**
  The MSDS outlines the basic plan to reduce risks associated with hazardous substances used in spray painting. Use the MSDS for each substance as the starting point, and fine tune your plan so it addresses the circumstances which apply in your own workplace.

• **Keep records of the hazardous substances you use, and of how you have assessed the problems they present in your workplace**
  You are required to do this by law. In any case it is an essential part of your risk control plan, as it provides a ready reference as to how things should be managed.

• **Minimise the use of the most hazardous substances**
  You may have a number of options for minimising the use of hazardous substances:

  ➢ Try to replace solvent based cleansers with water based cleansers.
  ➢ Use water based paints where possible, minimising the use of polyurethane and acrylic lacquers and 2 pack paints.
  ➢ Where you need to use a highly hazardous substance like Isocyanates (found in hardeners), adopt spray techniques which minimise the level of overspray and rebound.
  ➢ Look at alternative ways of applying paint for some jobs.

• **Separate people from the hazard by establishing a spray zone**
  A spray zone is a specific area for spray painting that limits entry by use of physical barriers or time delays. (The size of the spray zone and the time delay will depend on the nature of the substances being used.) The spray zone can be within an enclosure or booth, or may be applied in an open air situation. In either circumstance, the zone should be designated with warning signs. (eg. ‘SPRAY ZONE: UNAUTHORISED PEOPLE KEEP OUT. NO SMOKING, NAKED FLAMES OR OTHER SOURCES OF IGNITION’)

  Barriers to restrict entry of unprotected persons to the zone should be constructed and ignition sources (eg. lit cigarettes, abrasive grinding) must be removed.

  The spray zone should be clear of substances not immediately needed, and wastes should be removed from the area to minimise fire risks. A spray zone can only provide limited protection to painters and other people and should only be an option where a spray booth is not practicable.

• **Install suitable ventilation to reduce exposure to substances**
  Ventilation is a primary means of reducing the level of vapours and aerosols in the atmosphere in which spray painting work is done. It also reduces the risk of fire or explosion. Where practicable a spray booth should be used as this is the most effective way of reducing hazards. The types of ventilation in order of their effectiveness are:
➤ Down draft spray booth
➤ An open spray booth
➤ Local exhaust ventilation (exhaust fan extraction)
➤ Dilution ventilation (uses fans or natural air currents to displace contaminated air)

Even though down draft spray booths are the most effective, other measures like PPE will still be required.

For the less effective dilution ventilation system, there are practices that should be followed to achieve a minimum level of safety. They include:

- ensuring the operator is always between the air inlet supply and the source of vapours;
- ensuring the exhaust outlets are as close to the spray painting as possible;
- setting up the system to ensure the air flows through the spray zone and does not re-enter the work area.

These recommendations also apply to preparation and clean up tasks and areas.

- **Minimise electrical safety risks and ignition sources**
  All equipment located within the spray painting zone should be checked to ensure it is safe and suitable for use in such an area. Normal domestic electrical equipment, motors, powertools, heaters etc may become dangerous as ignition sources.

  Some spray painting processes, like electrostatic painting and airless spray painting, can produce static electricity: all equipment and containers and the person using them should be earthed.

- **Use practices that minimise the exposure of the spray painter**
  Whatever other measures are used (booths, PPE) additional protection can be gained by adopting work practices that further minimise exposure. The painter should avoid being positioned between the object being sprayed, and the exhaust. This can be achieved by:

  ➤ using ‘in-line’ spray booths, to ensure operators do not spray towards each other or other persons;
  ➤ rotating objects on turntables or hooks to avoid spraying against the airflow;
  ➤ keeping spray below shoulder height when using down draft booths.

- **Use clean up and storage practices that minimise exposure and fire risks**
  Use of water based cleansers, soaking cleaning rags in “wet bins”, and ensuring surplus or unused product is correctly labelled and sealed are among the standard practices that should be adopted. Make sure suitable wash up facilities are available.

  Storage of substances should also take into account their other properties (as flammables or combustibles). Use of separate storage areas and storage cabinets will be required to meet legal obligations in regard to Dangerous Goods. Waste paint, solvents and clean up materials must be safely disposed of.
• Use and maintain Personal Protective Equipment in addition to other measures

The MSDS will state what PPE is appropriate: its recommendations should be followed where practicable. Recommended PPE might include:
  ➢ Air supplied respirators
  ➢ Half face particulate respirators
  ➢ Eye protection
  ➢ Suitable gloves and overalls
  ➢ Hearing protection

This equipment should be used in conjunction with other risk control measures.

Employees need to be involved in the selection and fitting of PPE and trained in its correct use. PPE must be suitably stored away from sources of contamination and regularly inspected for signs of wear and tear. Filters should be regularly checked and replaced when necessary. AS/NZS 1716 Respiratory protective devices, and AS/NZS 1715 Selection, use and maintenance of respiratory protective devices provide specific guidance on these issues.

• Be prepared for emergencies

Leaks, spills or uncontrolled release of hazardous substances may occur despite your best efforts, and emergency plans must be developed for such an eventuality. Correct labelling and availability of MSDSs will make any situation easier to deal with and provide the basis for procedures that staff can be trained in. Fire protection measures must be in place and first aid and emergency plans must be included as part of your plan.

You may already have taken steps to manage your spray painting risks. It is important that you know whether or not your actions continue to provide effective safeguards for your employees – before the health and safety of any person is put at risk.

• Build in a periodic review of your procedures, involving the people who have accountabilities for health and safety. Ensure that spray painting equipment (including booths, exhaust ventilation, spray guns and compressors) is regularly inspected and maintained.
• If you change the type and formulation of paint ensure measures are appropriate.
• If work practices are modified, or new work practices introduced, review your preventive measures against the assessment factors to ensure they are still adequate.
• If a spray painting incident (injury, illness or ‘near miss’) occurs, review the procedures you had in place at the time, and make changes to prevent a recurrence.
• If new information is obtained about a previously unidentified hazard, review your preventative measures.

• Special note on atmospheric monitoring and health surveillance

As noted earlier atmospheric monitoring may be required to assess whether you are meeting exposure standards for the hazardous substances you are using. It can also be used as a way of checking whether your controls are working to reduce risks. An occupational hygienist can undertake this monitoring and recommend any changes you need to make.
Health surveillance involves periodic health checks of any employees who are exposed to hazardous substances. Types of health surveillance include biological monitoring (e.g. determining the presence of substances in blood, urine or expired air), medical tests such as lung function tests and medical examinations.

Health surveillance is required where your assessment shows employees are exposed to a risk to health from one of the hazardous substances, listed as a scheduled substance under OHS Regulation 2001. Isocyanates regularly found in two pack spray paint are scheduled substances. Health surveillance may also be required where there is a reasonable likelihood of an adverse health effect occurring under the particular conditions of work.

You should check Chapter 6 Hazardous Substances of the OHS Regulation 2001 to establish what health surveillance you need to do.

**Employers/Managers**

Employers and managers must know the effects of exposure to hazardous substances, the risks of fire and explosion and other hazards associated with spray painting. Managers and supervisors will be accountable for making sure that preventive measures are implemented, understood by employees, and monitored. Keeping of records of assessments, training and any monitoring or health surveillance is an essential part of the plan.

In many smaller workplaces, employers and managers will themselves be directly exposed to these hazards – so they must protect the health and safety of both their employees and themselves.

**Employees**

Employees must know and be consulted on the harmful effects that may result from spray painting, and the measures in place for their protection. They must also recognise the physical ‘warning signs’ if their health is affected by work involving spray painting.

Provision of MSDSs is required by law, and is the best first step in advising employees of hazards and recommended safeguards. You must consider the needs of employees whose first language is not English, and make sure they understand both the risks and the chosen controls.

**Contractors, suppliers, customers and visitors**

All people who undertake work for you, or enter the workplace as a visitor, must be made aware of your expectations in regard to their safety. If contractors, suppliers, customers or visitors may at some time be exposed to spray painting hazards, you must also take steps to ensure their safety.
Some frequently asked questions

Q. What hazardous substances are used in the spray painting process and where is the register listing them?
Q. Have MSDSs been made available to employees and are they up to date?
Q. What assessment of spray painting risks has been undertaken and have you kept records of them?
Q. Has any atmospheric monitoring been undertaken?
Q. What sort of booth is used for spray painting?
Q. If a spray booth is used, when was it last subject to inspection and maintenance?
Q. Has any health surveillance been undertaken where scheduled hazardous substances (e.g., isocyanates, lead-based paint) are used?
Q. Is the electrical plant associated with spray painting well maintained and isolated to reduce ignition sources?
Q. How are substances used in spray painting labelled, where are they stored and how are they disposed of?
Q. What Personal Protective Equipment (gloves, respirators, eye protection) is used and how is it stored and maintained? When were filters and gloves last changed?
Q. What training has been provided to employees?

• How do I deal with some of my employees who will not use the PPE that is provided, saying it is uncomfortable to wear and interferes with the job?
Employees need to be involved in the selection and fitting of PPE and must be made aware of the recommendations on the MSDS. Employees have obligations to follow safety procedures, and these must be enforced. Effective ventilation and isolation practices may reduce the level of PPE which is needed.

• How do I know if the spray booth I use is effective in removing vapours and aerosols from the area where the spray painter is working?
There are specific standards (available from Standards Australia) describing the airflow rate which should be achieved, and you can have this tested. Also, you can have atmospheric monitoring conducted that will tell you whether employee exposure to the substance you are using is within the required limits.

• If I am using two pack paints do I have to use a full face air supplied respirator and have the health of employees checked?
Yes. Two pack paints contain isocyanates and are listed as hazardous substances that require health surveillance. Unless you can demonstrate that there are minimal risks you will need to arrange health checks as required by the regulation. MSDSs for these substances state that full face air supplied respirators should be used. This protection should be used in combination with a suitably ventilated enclosure.
### Sample assessment and risk control plan: Panel shop

#### EMPLOYEE EXPOSURE TO HAZARDOUS SUBSTANCES DURING SPRAY PAINTING

#### RISK ASSESSMENT FACTORS

**Type of hazardous substance used:** Identified on label as containing hexamethylene diisocyanate.

**Routes of entry to body:** Inhalation, injection and skin contact.

**Health effects of substance:** MSDS states respiratory irritation and sensitisation, skin sensitisation.

**Nature of the work:** Spraying of car body panels.

**Number of people who could be exposed:** 3 employees working in and around booth.

**How often and how long each exposed:** Typically each would spend 4 hours spraying each day.

**Nature of object being sprayed:** Passenger motor vehicles.

**Enclosure used:** Down draft spray booth.

**Type of spray painting:** Airless (high pressure).

**PPE currently used:** Half face respirator, latex gloves.

#### HOW SERIOUS IS THE POTENTIAL EXPOSURE AND WHAT SHOULD BE DONE TO REDUCE IT

**Summary Assessment:** Potential for exposure to substances by inhalation is extremely high, and potential for skin contact is high. The length of exposure in the spraying task plus exposure in preparation and clean up stages indicates more effective ways of preventing exposure are required. Current PPE is not adequate.

**Recommended actions:**

- Ensure MSDS is distributed to employees affected
- Put copy of MSDS with list of substances used in workplace
- Ensure spray booth and air filters are clean
- Ensure ventilation in area around booth extracts contaminated air
- Ensure spray equipment is adjusted for most efficient spraying of paint
- Use full face air supplied respirators as recommended on MSDS. Brief and train employees on their use
- Ensure suitable gloves and body protection are provided
- Ensure hearing protection is provided if noise levels are high
- Rotate employees to minimise exposure and ensure they take short breaks
- Check adequacy of emergency procedures and first aid facilities
- Regularly check the effectiveness of your controls and assess situation if you introduce new products, equipment or practices

**Special measures:**

- Previous practices indicate health surveillance is required and medical checks should be arranged
- Previous practices indicate the need for atmospheric monitoring to check exposure levels

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Note: This worked example deals only with spray painting work and does not include preparation and clean up stages. Each of these stages should be assessed along with the other hazards such as fire, explosion, noise and manual handling.
1. **Identify your hazards**
   Know:
   ✓ What hazardous substances are used?
   ✓ What the MSDS says about the substance, including how it gets into the body, what effects it has, how it should be controlled?
   ✓ How many of your employees, contractors, visitors, suppliers or customers could be exposed to substances used in spray painting, and for how long?
   ✓ Whether health surveillance is likely to be required?
   ✓ What your employees can tell you about the hazards involved?

2. **Work out how serious your problem might be**
   Look at:
   ✓ The nature of the object being sprayed and the positioning of the object in relation to the spray painter.
   ✓ The frequency and duration of task.
   ✓ The effectiveness of current measures to isolate people from spray hazards.
   ✓ The types of ventilation used to reduce exposure to hazardous substances.
   ✓ The method of spray painting used and work practices adopted by employees.
   ✓ The suitability and effectiveness of different types of PPE.

3. **Take preventive action**
   ✓ Have you taken steps to eliminate or control exposure to hazardous substances and made sure everyone knows the practices which must be followed?
   ✓ Does your plan use several measures (booths, restricted areas, time delays) to reduce exposure, as well as relying on PPE?
   ✓ Have you made first aid and emergency arrangements? Do people understand them?

4. **Checking that your preventive measures are adequate**
   ✓ When were the spray booth and PPE last inspected and checked for effectiveness?
   ✓ Have any employees reported symptoms that are listed on the MSDSs?
   ✓ Have you provided refresher training to employees in your operational and emergency procedures?
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