



INDUSTRY ENVIRONMENTAL GUIDE FOR  
**SURFACE  
COATING**

## **Acknowledgements**

Brisbane City Council would like to acknowledge the New South Wales Office of Environment and Heritage and the Institute of Surface Coating for their technical assistance in the development of this guide.

## **Please note**

This guide provides information relevant at the time of publication. While reasonable efforts have been made to ensure the contents are factually correct, Brisbane City Council does not accept responsibility for the accuracy or completeness of the contents and is not liable for any loss or damage that may occur directly or indirectly through the use of, or reliance on, the contents of this guide.

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## Abbreviations

### DEHP

Department of Environment and Heritage Protection

### EMS

Environmental management system

### HVLP

High-volume, low-pressure (spray gun)

### NPI

National Pollutant Inventory

### QUU

Queensland Urban Utilities

### SDS

Safety data sheet/s

### TEP

Transitional Environmental Program

### VOCs

Volatile organic compounds

### WH&S

Workplace health and safety

### WMP

Waste management plan

# 1 About this guide

This guide is part of a series prepared by Brisbane City Council. Similar guides for other business sectors are available from Council's website [www.brisbane.qld.gov.au](http://www.brisbane.qld.gov.au) or by calling Council's Contact Centre on (07) 3403 8888.

## What is the purpose of this guide?

This industry environmental guide is not a statutory document and is not law. Instead, it offers advice to assist the surface coating industry in Brisbane to:

- meet the requirements of *Brisbane City Plan 2014* (City Plan) when building, upgrading, extending or altering a surface coating workshop
- meet the requirements of the *Environmental Protection Act 1994*, administered by Brisbane City Council, when operating a surface coating workshop.

Surface coating businesses undertake activities such as abrasive blasting, spray painting, powder coating, anodising, electroplating and galvanising. These activities are often located close to residential areas, so noise, airborne particles, odours and other pollutants must be carefully managed to protect the health and wellbeing of surrounding communities and the natural environment.

Each section of the guide addresses a separate aspect of the surface coating process, from abrasive blasting to spray painting, electroplating and powder coating. It also offers advice for designing new workshops, upgrading existing workshops and conducting abrasive blasting and spray painting on location.

Businesses using this guide can be confident they are doing what is required to protect the environment and prevent an environmental incident.

## Who are the intended users of this guide?

- Businesses and individuals involved in building, upgrading, extending, altering or operating a surface coating business in Brisbane.
- Brisbane City Council officers involved in assessing development applications and conditioning development approvals under City Plan.
- Brisbane City Council officers involved in investigating environmental nuisance and minor water offences under the *Environmental Protection Act 1994* (the Act).



## What are the business benefits?

Good environmental management practices do more than preserve the natural environment – they can save businesses money. Minimising waste, increasing resource efficiency and recovery and adopting cleaner production methods have been shown to reduce operating costs.

Businesses with high environmental standards enjoy:

- an enhanced reputation
- the opportunity to be a supplier of choice to corporate and government clients who may consider the environmental performance of suppliers and products as part of green procurement policies
- a high level of employee satisfaction, retention and productivity.

Other benefits of a high level of environmental management include:

- reduced loss of materials
- reduced waste disposal costs
- reduced water and electricity costs
- a level playing field for pollution control across the industry, providing fairer competition for all companies in the market
- lower spill clean-up costs
- fewer disruptions to business operations
- reduced costs associated with complaints from the community
- reduced potential for litigation arising from pollution incidents.



## Building, upgrading, extending or altering a surface coating workshop

Building, upgrading, extending or altering a surface coating workshop may trigger the need for a development approval from Brisbane City Council under City Plan. Call Council's Contact Centre on (07) 3403 8888 for advice on whether a proposed development requires approval.

City Plan regulates development in the city. It requires industrial development to comply with performance-based assessment criteria contained in its 'codes'. One of the main codes that new industrial development must comply with is the Industry Code.

Overlays, also contained in City Plan, (e.g. Flood overlay) or neighbourhood plans, which direct development in local communities, may add additional requirements depending on the development's location.

The Industry Code includes assessment criteria for:

- air quality
- surface water and groundwater
- storing chemicals and fuels
- noise.

An air quality impact report, prepared in accordance with the *Air Quality Planning Scheme Policy*, or a noise impact report, prepared in accordance with the *Noise Impact Assessment Planning Scheme Policy*, can assist in demonstrating achievement of the air quality (planning) criteria and the noise (planning) criteria of the Industry Code.

## Operating a surface coating business

Operators of surface coating businesses must comply with the *Environmental Protection Act 1994* (the Act). This law places a general environmental duty on individuals and companies to protect the environment and to take all reasonable and practical measures to prevent or minimise environmental harm and nuisance. Council regulates environmental nuisance and minor water offences from Brisbane businesses not licensed by the Queensland Government.

Environmental nuisance includes an unreasonable interference or likely interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. The environmental nuisance provisions of *the Act* can be viewed at the Queensland legislation website [www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

Read the sections on **Abrasive blasting, Spray painting, Powder coating and Anodising, electroplating and galvanising**, contained in this guide, for advice on ways to reduce environmental risks through good design and layout.

Minor water offences include unlawfully depositing a prescribed water contaminant in a waterway, roadside gutter or a stormwater drain or in a place and in a way so that the contaminant could be reasonably expected to wash, blow or fall into a waterway, roadside gutter or stormwater drain.

Prescribed water contaminants include chemicals, sediment, cement, concrete, acids, alkalis, building materials, oil, petrol, radiator and engine coolant and paint. A complete list is contained in Schedule 9 of the *Environmental Protection Regulation 2008*, which can be viewed at [www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

If a business's infrastructure is not sufficient to prevent or minimise water pollution or environmental nuisance, well-developed and documented environmental protection practices and procedures can help it demonstrate compliance with the general environmental duty. If practices and procedures cannot adequately demonstrate compliance with the general environmental duty of *the Act*, the facilities may need upgrading.

## Environmental authority

Businesses engaged in 'environmentally relevant activities' such as surface coating are required to obtain an Environmental Authority under *the Act* from the relevant administering authority. A complete list of environmentally relevant activities is contained in Schedule 2 of the *Environmental Protection Regulation 2008*, which can be viewed at [www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

Environmentally relevant activity 38 (Surface coating) is divided into two categories, with various threshold levels as illustrated in Table 1.



**Table 1: Environmentally relevant activity 38 (Surface coating)**

ENVIRONMENTALLY RELEVANT ACTIVITY	THRESHOLD	ADMINISTERING AUTHORITY
ERA 38 (1)(a)	Anodising, electroplating, enamelling or galvanising using 1 t to 100 t of surface coating material	Brisbane City Council
ERA 38 (1)(b)	Anodising, electroplating, enamelling or galvanising using 100 t to 1000 t of surface coating material in a year	DEHP
ERA 38 (1)(c)	Anodising, electroplating, enamelling or galvanising using more than 1000 t to 10,000 t of surface coating material in a year	DEHP
ERA 38 (1)(d)	Anodising, electroplating, enamelling or galvanising using more than 10,000 t of surface coating material in a year	DEHP
ERA 38 (2)	Coating, painting or powder coating using more than 100 t of surface coating material in a year	DEHP

For more information on applying for an Environmental Authority contact:

- Department of Environment and Heritage Protection (DEHP) on 1300 130 372 or refer to [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)
- Brisbane City Council on (07) 3403 8888 or visit [www.brisbane.qld.gov.au](http://www.brisbane.qld.gov.au)



## Penalties for environmental offences

Environmental offences can lead to fines of up to \$500,000 and ruin a business's reputation.

Everyone involved in the business is responsible for adhering to environmental laws, from managers through to supervisors and subcontractors. Managers and directors can be directly prosecuted for an offence and even face jail. Lack of knowledge is no defence – they must either demonstrate due diligence was exercised to prevent the offence or that they could not influence the conduct of their company.

In court, the prosecutor may not have to prove that an individual or organisation intended to cause the environmental nuisance or harm. Even accidents caused by negligence can result in fines and prosecution.

Penalties include:

- on-the-spot fines of more than \$1000 for an individual or several thousand dollars for a company for minor noise, air or water breaches of the *Environmental Protection Act 1994*
- up to \$70,000 or more for individuals found guilty of causing environmental harm and \$250,000 or more for companies guilty of the same offence
- up to \$500,000 and/or up to five years' jail for the most serious offences such as wilful breaches of the law that harm or are likely to harm the environment.

## Other issues to consider

### Reporting incidents that may harm the environment

If a pollution incident occurs and it causes or threatens harm to the environment, by law the appropriate regulatory authority must be notified as soon as the incident is made known. This duty to notify pollution incidents extends to employers, the person carrying out the activity, employees, occupiers, contractors and agents.

For more information call Brisbane City Council on (07) 3403 8888 or visit [www.brisbane.qld.gov.au](http://www.brisbane.qld.gov.au)

### Reporting land contamination

The Department of Environment and Heritage Protection must be notified if a business causes land contamination. This duty to notify falls on the owner of the property and on the person whose activities have caused the contamination.

For more information call the Department of Environment and Heritage Protection on 1300 130 372 or refer to [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

### Notifiable activities

Some industrial activities that have the potential to contaminate land are defined as notifiable activities under the *Environmental Protection Act 1994*. The owner or the occupier of the notifiable activity must notify the Department of Environment and Heritage Protection of the location. The Department records notifiable activities on the Queensland Environmental Management Register.

For more information call the Department of Environment and Heritage Protection on 1300 130 372 or refer to [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

## National Pollutant Inventory (NPI)

The *National Environment Protection (National Pollution Inventory) Measure 1998* requires certain industries to report their emissions via the National Pollutant Inventory (NPI).

For more information call the Department of Environment and Heritage Protection on 1300 130 372 or refer to [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

## Regulated wastes

Some wastes removed from a business such as oil, chemicals or contaminated water are defined as regulated waste under the *Environmental Protection Act 1994*. Regulated waste must be removed by a licensed waste transporter and records of removal kept on site.

For more information call the Department of Environment and Heritage Protection on 1300 130 372 or refer to [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

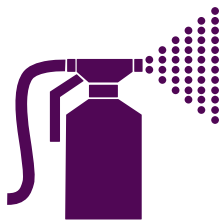
## Trade waste

The release of waste by a business in Brisbane into the sewerage system may require a permit from Queensland Urban Utilities.

For more information call Queensland Urban Utilities on 13 26 57 or refer to [www.urbanutilities.com.au](http://www.urbanutilities.com.au)

# 2 Priority actions for surface coating workshops

The short summary below outlines the most important actions businesses can take at each stage of the surface coating process to protect the environment and surrounding community. These are explored in greater detail within individual chapters.



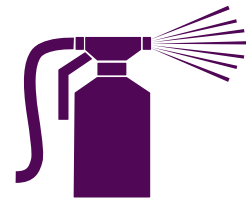
## Abrasive blasting

- Keep the blast chamber doors closed while blasting.
- Ensure dust filters are tight-fitting, without gaps and properly cleaned and maintained.
- Undertake open blasting on a concrete surface that has permanent or temporary bunding.
- Use temporary screens to fully enclose open blasting on all sides and above.



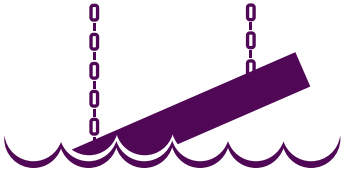
## Spray painting

- Spray paint in a booth or a designated spray painting area.
- Maintain and regularly replace spray booth filters.
- Ensure filters are tight-fitting with no gaps.
- Use water-based paints where possible.



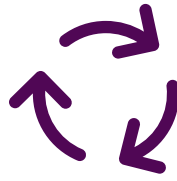
## Powder coating

- Only powder coat in a spray booth.
- Maintain and regularly replace spray booth filters.
- Keep the spray booth dust extraction equipment properly maintained.
- Vacuum the workshop regularly to control dust.



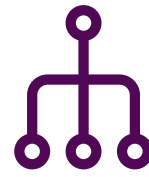
## Anodising, electroplating and galvanising

- Design the external perimeter of the dipping tank area to contain spilt liquids and allow for easy clean-up.
- Optimise chemical solution temperatures in process tanks and baths to reduce wastage and toxic fumes.
- Isolate loading and unloading areas from the stormwater system during handling activities so spills do not leak into the stormwater system.
- Ensure emergency clean-up equipment and procedures are in place.



## Waste management, resource recovery and resource efficiency

- Reduce waste to maximise cost savings.
- Prepare a waste management plan.
- Segregate wastes to make recycling easy.
- Use a licensed waste transporter to dispose of regulated waste. Keep all collection paperwork.



## Environmental management systems

- Develop an environmental policy to guide business operations.
- Create an environmental action plan outlining ways to manage risks.
- Conduct risk assessments of possible hazards.
- Document pollution prevention procedures including staff training.



## Storage of chemicals

- Order and store chemicals in the smallest quantities possible.
- Store chemicals within a bunded, covered and signed area.
- Ensure spill clean-up equipment is located close to chemical storage areas.
- Prepare a spill response plan and keep clean-up equipment close to chemical and fuel storage areas.



## Noise management

- Limit noise at night, in the early morning and on Sundays and public holidays.
- Compare noise levels when buying new equipment and choose the quietest option.
- Enclose stationary noise sources such as compressors, motors and pumps.
- Use moveable acoustic screens around noise sources such as grinding, hammering or sanding.

# 3 Abrasive blasting

## Environmental impacts

Spent abrasive and blasting waste can contain toxic chemicals and heavy metals such as lead, cadmium and arsenic. If these substances are swept, hosed or left to be washed by rain into stormwater drains, they can contaminate the soil, kill aquatic plants and animals, degrade local creeks and Moreton Bay, impact on recreational fishing and swimming and pass up the food chain to humans.

Contaminating the soil or groundwater around a business not only damages the environment but can also reduce the property's value. Contaminated sites require expensive remediation to make them safe for people, plants and animals.

Dust from abrasive blasting can seriously affect the health and wellbeing of people at neighbouring businesses and residential areas as it can contain toxic, heavy metal particles.

## Abrasive blasting methods

Abrasive blasting is a common method of cleaning and preparing structures, heavy machinery, marine vessels and other objects before surface coating.

Abrasive blasting must be carried out in a way that prevents or minimises dust escaping from work areas, and blasting waste and debris from contaminating soil or water.

Abrasive blasting can be undertaken:

- in a blast chamber
- in the open, utilising a blasting yard or using mobile abrasive blasting techniques.

Each of these abrasive blasting methods has pollution risks that require careful control.

## In-chamber abrasive blasting

In-chamber abrasive blasting describes work done in a totally enclosed chamber (or cabinet) that is vented to the atmosphere via a dust collection system and a dust filter. It is the safest way to prevent pollution when abrasive blasting and should always be the first method considered. Blasting cabinets are suitable for small objects, while blasting chambers should be used for larger ones.





## Open abrasive blasting

Open abrasive blasting using temporary enclosures should only be used when the object or structure cannot be transported or is too large for a blasting chamber, or for fixed structures such as bridges or water tanks.

Even though a blasting chamber is not being used, open abrasive blasting must still be done in a way that prevents or minimises pollution such as dust, spent blasting media and blasted debris from entering the soil, stormwater drains, waterways or neighbouring properties. This applies to blasting yards and on-site abrasive blasting using mobile techniques.

Open abrasive blasting uses either dry or wet blasting techniques. Each type has its own pollution risks and hazards that need to be managed.

## Pollution control measures

Blasting chambers, including cabinets, are the safest way to prevent pollution when abrasive blasting and should always be the first method considered.

Dust can be prevented from escaping the blast chamber and entering soil, stormwater drains, waterways or neighbouring properties by:

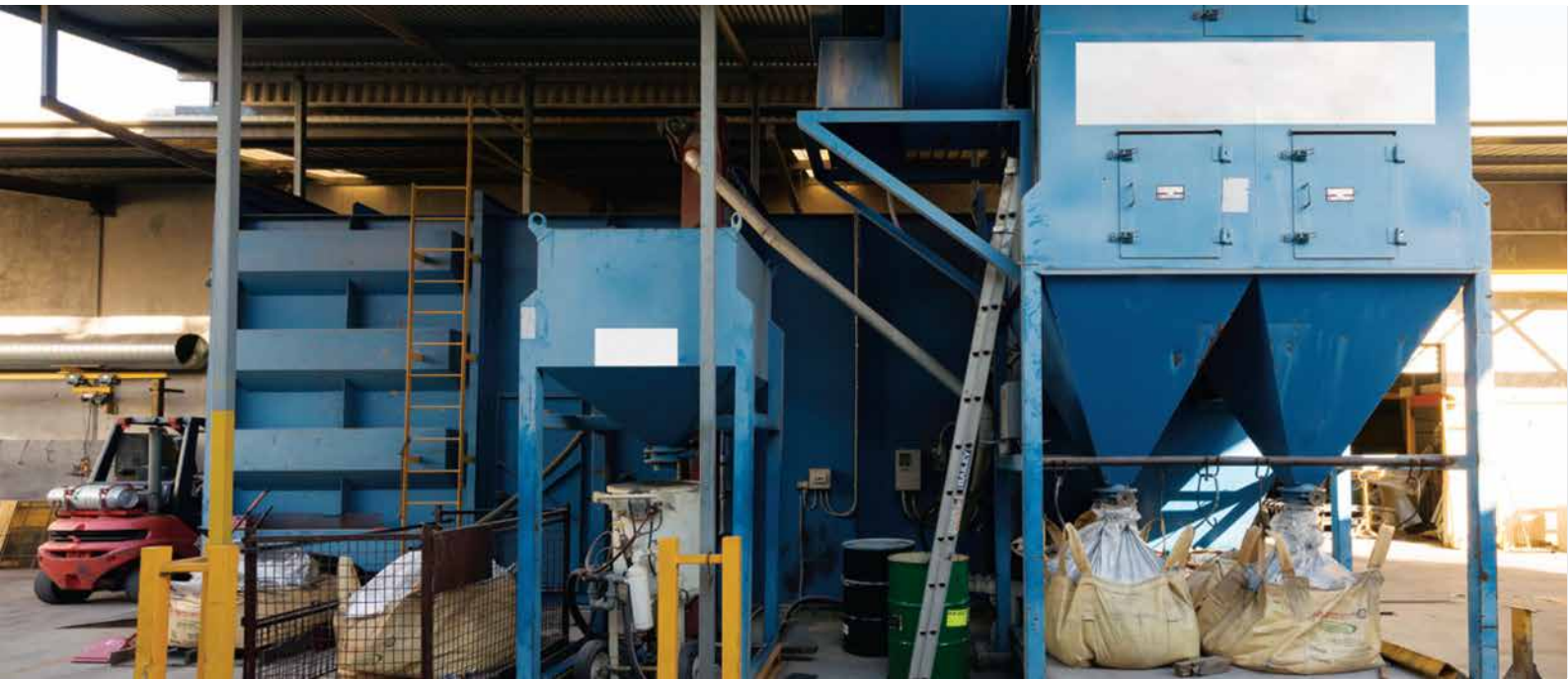
- keeping the doors closed while blasting is taking place
- keeping the doors closed for a suitable time after blasting stops to allow the residual dust to settle or be extracted via a dust filter
- ensuring dust filters are tight-fitting, without gaps and properly cleaned and maintained
- ensuring the waste collection container attached to the dust collection system is tight-fitting and sealed.

Blast chambers should have an audible or visible alarm in the filter arrangement to alert the operator if the dust collection system or filters fail. Properly clean and maintain the dust collection system and filters in accordance with the manufacturer's recommendations to ensure continued good performance.

Obviously, some items such as ships, aircraft, bridges and fixed structures are too large for a blast chamber. Open abrasive blasting must still be done in a way that prevents or minimises dust, spent blasting media and debris from entering the soil, stormwater drains, waterways or neighbouring properties.

Pollution control measures for open abrasive blasting include the below.

- Do not clean blasted items on to the surrounding soil or into stormwater drains.
- Use temporary screens to fully enclose the blasting activities on all sides, including above and below (e.g. if blasting a structure such as a bridge). The screens should be capable of containing dust, spent blasting media and debris within the work site.



Where the work site cannot be roofed, side screens need to be high enough to prevent dust, spent blasting media and debris from escaping. For example, screens should extend at least two metres above the item being blasted.

- Use portable vacuum dust recovery systems for dry blasting on small work areas.
- Blast the item in a downward direction/manner where practical.
- Clean up all waste before it can:
  - be blown away
  - wash away or spill into drains and waterways
  - cause land contamination or harm to the environment.
- Collect spent material from the blasting site using a method that least disturbs the material. Vacuum recovery equipment offers the best protection for operators. Avoid methods that generate dust such as sweeping or blowing down with compressed air.

- Undertake dry blasting on a concrete surface wherever possible. The concrete surface should have permanent or temporary bunding capable of containing spent blasting media and debris. Where it is not practical to undertake dry blasting on a concrete surface, for example when blasting a fixed structure, a temporary screen should be used underneath the item to collect the spent blasting media and debris and prevent it from entering water or soil. The temporary screen should be made of a material that is impervious and easy to clean such as a tarp or plastic sheets. It should be configured and installed in a way that has no gaps and prevents leaks.

Wet blasting minimises dust emissions. However, additional measures can reduce pollution impacts further, as outlined below.

- Undertake wet blasting on a concrete surface with permanent or temporary bunding capable of containing spent blasting media, debris and wastewater.

The concrete surface should direct or drain wastewater to a treatment system or holding tank for:

- disposal to sewer under the conditions of a trade waste approval or
- disposal via a licensed waste transporter.
- Ensure any corrosion inhibitors used to reduce flash rust are prevented from contaminating water and soil. Consider using biodegradable corrosion inhibitors free from chromates, nitrates and nitrites and that are compatible with the adhesion requirements of the surface coating materials to be used.

Adopt the general protection measures outlined below when undertaking blasting activities.

- Prevent stormwater from entering or leaving blasting areas during rain by directing stormwater flows around the worksite. This will avoid wastes being carried in stormwater to drains and waterways.
- Do not hose workshop floors on to the surrounding soil or into stormwater drains.

## Community liaison

Communicate with nearby residents or businesses when carrying out one-off, in-situ abrasive blasting work, such as on a bridge or other structure. Provide neighbours with information about the proposed work to let them know where and when the job will be undertaken and how long it will take.

Outline the potential impacts and explain the pollution control measures planned. Provide direct contact details (a hotline) to the work site so that concerns from the local community can be addressed immediately. Good, timely communication with people who could be impacted by the work may limit the number of complaints, meaning fewer disruptions to the job.

## Blasting media

Blasting media may be toxic and can be very harmful to blasting operators, neighbours and the environment. Workplace health and safety laws restrict the use of some hazardous materials in an abrasive blasting process. Recyclable and less toxic abrasives include garnet, chilled iron grit, cast steel grit or cast iron shot.

When choosing a blasting media, consult the *Abrasive Blasting Code of Practice 2013*, approved under the *Work Health and Safety Act 2011*. For more information call Workplace Health and Safety Queensland on 1300 369 915 or refer to [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

## Recycling blast material<sup>1</sup>

During abrasive blasting, the spent material endures high-velocity impact with the surface being cleaned, producing shattered abrasive and dust, combined with particles of the material being removed. The recycling process separates these and allows the recovered abrasive to be reused efficiently and safely without increasing dust. Wet abrasive cannot be recycled as dust separation is not possible. Sometimes, it is also impossible to remove toxic chemicals such as lead paint from used abrasive. In these cases, the abrasive should be disposed of by a licensed regulated waste transporter.

Recycling blast material involves three stages – collection, cleaning and reuse.

### Collection

Collect spent material from the blasting site using the method that least disturbs the material. Vacuum recovery equipment offers the best protection for operators. Avoid using methods that generate dust, such as sweeping or blowing down with compressed air.

## Cleaning

Collected materials contain various contaminants as well as reusable abrasive grains. The contaminants should be separated from the media by passing the material through engineered equipment such as air washes, cyclones and screens as required.

The following contaminants should be extracted before the blast material is reused:

- oversized waste – all particles (e.g. rust, paint flakes and other foreign matter) that are of sufficient size to clog the blast machine metering valve or nozzle
- toxic dust – any toxic contaminants that have been introduced or released into the media (e.g. lead from paint)
- nuisance dust – fine shattered abrasive grains
- respirable dust – powdered material that is small enough to penetrate deep into the lungs.

If abrasive blasting has been carried out on a substrate containing grains of sand (e.g. foundry castings or concrete), it may contain significant amounts of crystalline silicon dioxide of a similar particle size to recyclable spent abrasive material.



<sup>1</sup> Safe Work Australia, *Abrasive blasting – Code of Practice*, October 2012, p28.



Abrasive materials used in this kind of work should not be recycled unless it can be established that the concentration of crystalline silicon dioxide remains below the allowed amount.

### Reuse

After recyclable material has been collected and cleaned, return it to the blast machine for reuse.

### Waste disposal

Abrasive blasting waste may be classified as regulated waste under the *Environmental Protection Act 1994* depending on what it contains (laboratory testing may be required to check.) Blasting media that contains toxic substances produces hazardous wastes. This waste must be removed and disposed by a licensed regulated waste transporter.

Managing and disposing of regulated wastes is subject to specific regulatory requirements. For a full list of regulated wastes, refer to **Schedule 7 of the *Environmental Protection Regulation 2008***.

Collect all spent abrasive and blast waste and store it in sealed containers or bags before collection and disposal by a licensed waste transporter. Keep records as proof of proper disposal.

Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.

### Workplace health and safety considerations

Abrasive blasting can generate respirable dust (dust small enough to penetrate deep into the lungs) or toxic dust depending on the blasting media, the surface coatings being removed and the object being blasted. Workplaces must comply with the *Work Health and Safety Act 2011*. Consult the *Abrasive Blasting Code of Practice 2013*, approved under the *Work Health and Safety Act 2011*. For more information call Workplace Health and Safety Queensland on 1300 369 915 or refer to [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

Also refer to the *Australian Standard AS1627: Metal finishing – preparation and pre-treatment of surfaces and Australian Standard AS4361: Guide to lead paint management*.

Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice on managing lead-contaminated waste.

### Location of noisy equipment

Carefully consider where to place noisy equipment such as air compressors and dust extraction systems when designing an abrasive blasting workshop. Ideally, noisy equipment should be inside the workshop or within an acoustic enclosure.

Check the manufacturer's noise label fixed to the equipment, to find out how much sound it makes in decibels. Compare labels and buy the quietest item. Refer to Figure 1.

Read the **Noise management** section of this guide for more advice.





### Energy efficiency

Build in ongoing cost savings by incorporating energy-efficient design and equipment into new and upgraded workshops such as:

- wall and ceiling insulation
- skylights
- LED or fluorescent lights
- solar hot water systems and air-conditioners
- variable-speed air compressors.

### Inspection and maintenance programs

Routinely inspect all environmental control components, for example, at least weekly. This will help identify any potential problems before they occur. Use a checklist incorporating suggested requirements from this guide.

Documenting inspection and maintenance procedures for pollution control equipment, training staff in the procedures and undertaking a regular and effective site-specific inspection and reporting program can greatly assist in demonstrating compliance with

the general environmental duty of the *Environmental Protection Act 1994*.

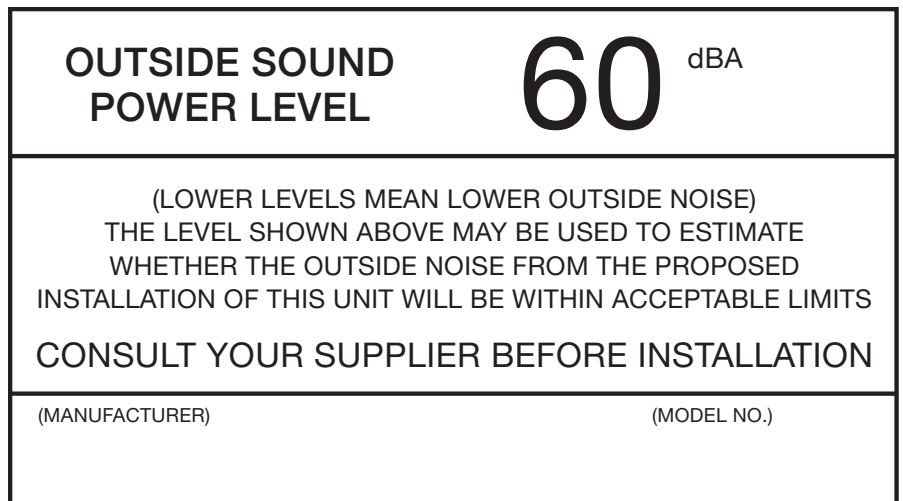
Read the **Environmental management systems** section of this guide for more advice.

### Training and procedures

Documenting all abrasive blasting procedures, including environmental protection, dust control and clean-up requirements, and training staff in the procedures, demonstrates due diligence has been taken to prevent or minimise environmental harm.

Read the **Environmental management systems** section of this guide for more advice.

Figure 1:  
Example noise label



# 4 Spray painting

## Environmental impacts

Spray painting can generate significant odours, toxic gases, dust and noise that can adversely affect nearby residents and businesses and Brisbane's air quality.

Many of the paints, primers and solvents used in spray painting contain volatile organic compounds (VOCs). These compounds vaporise at room temperature, are flammable, often odorous and can damage people's health. VOCs also contribute to the hazy air pollution known as photochemical smog.

VOCs are the main culprit behind chemical odour complaints by residents and other businesses. Spray painting, leaving lids off paint and solvent containers and cleaning equipment with solvents all generate these chemical odours.

Some two-pack paints contain isocyanates, which can cause health problems such as eye and skin irritation and breathing difficulties. Many isocyanates contain chemicals classified as potential carcinogens.

Fine paint and chemical particles carried by overspray can damage homes, cars and buildings and contaminate waterways.

Paint (and water contaminated with paint) needs to be kept out of stormwater drains, creeks and other waterways as it is a prescribed water contaminant that can kill aquatic plants and animals.

Paints contaminate waterways and, ultimately, damage the health of Moreton Bay, by:

- dissolving in water and clouding it, stopping sunlight from penetrating to the creek bed
- forming a film on the water and preventing oxygen from dissolving
- carrying toxic heavy metals into the water
- creating a fine, suffocating layer on the banks or beds of waterways.

## Designing a new spray painting workshop

The floor of a spray painting workshop should be sealed concrete, free of cracks and crevices, to prevent pollutants contaminating the soil and groundwater beneath.

Design the external perimeter to contain spilt liquids and allow for easy clean-up. Use drive-over bunding, kerbing and drainage channels to keep liquids from leaking out of doors and entrances. The design should enable the easy clean-up of spilt liquids.





## Spray painting booths and areas

Spray painting booths and designated spray painting areas should be designed, built and installed in accordance with:

- *Australian Standard AS4114.1: Spray painting booths, designated spray painting areas and paint mixing rooms – Design, construction and testing*
- *Australian Standard AS4114.2: Spray painting booths, designated spray painting areas and paint mixing rooms – Installation and maintenance*
- Brisbane City Council's requirements for filters and exhaust air outlets.

*Australian Standard AS4114.1* requires spray painting booth filters and exhaust air outlets to meet the requirements of local authorities such as Brisbane City Council.

New workshops, extensions or other modifications to workshops (requiring new or upgraded spray booths) in Brisbane must comply with the development requirements of City Plan.

New or upgraded spray booths that do not require a development application (for example, 'self-assessable' development or where booths are replaced in existing workshops) should incorporate filtration, stack height and flue velocity measures to protect community health and prevent environmental nuisance.

Spray booth overspray filters should:

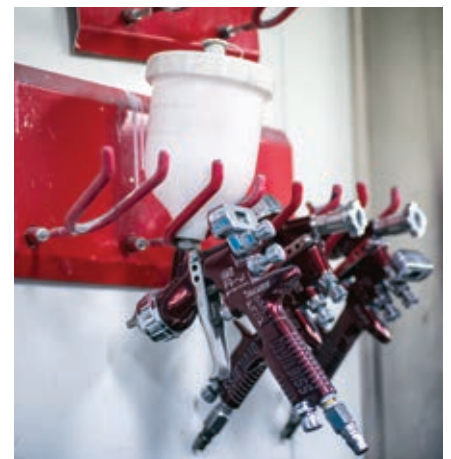
- remove at least 98% of overspray particles generated inside the booth
- be either wet filters or dry fibre filters such as corrugated cardboard or fibreglass
- be tightly fitted to stop particles bypassing the filter.

Overspray filters do not stop toxic gases and chemical odours from entering the environment. New or upgraded spray booths located near sensitive uses (e.g. within 250 metres of a home, childcare centre, hospital or school) should use other odour and gas control measures such as activated carbon filters or specialised exhaust vents.

Overspray can quickly clog activated carbon filters, so combine them with efficient overspray particle filters. Filtration systems should be designed and installed by a suitably experienced supplier.

Seek the advice of an air quality consultant early in the design stage and before submitting a development application to Council.

Increase the stack height or flue velocity to reduce offsite impacts of chemical odours and toxic gases. While these measures will not reduce the pollution released, they will help disperse and dilute pollutants from the stack. Appropriate stack heights and flue velocities vary between sites so engage an air quality consultant to advise on the best design.





### Paint mixing rooms

Rooms used to store paints, thinners, primers, gun wash and other liquid chemicals can create odours and release pollution into local waterways. Paint mixing rooms need to be designed, constructed and installed in accordance with *Australian Standards AS4114.1* and *AS4114.2*. They should also reflect advice contained in the **Storage of chemicals** section of this guide.

The mixing room's air exhaust system may need to be connected to the spray booth filtration system to reduce chemical odours if the workshop is near sensitive uses (e.g. within 250 metres).

### Location of noisy equipment

Carefully consider where to place noisy equipment such as air compressors and dust extraction systems when designing a spray painting workshop. Ideally, noisy equipment should be inside the workshop or within an acoustic enclosure.

Check the manufacturer's noise label, fixed to the equipment, to find out how much sound it makes (in decibels). Compare labels and buy the quietest item.

Read the **Noise management** section of this guide for more advice.

### Dust extraction equipment

Spray painting workshops should have dust extraction equipment in surface preparation areas. A fixed system, such as ducted extraction with a cyclone filter, may be a cost-effective option for a new workshop. Alternatively, mobile dust extraction equipment can be used, provided there are sufficient items for the workshop.

### Waste storage

New spray painting workshops should have sufficient space to segregate solid and liquid wastes and to store them securely. Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice on managing waste.

### Energy efficiency

Build in ongoing cost savings by incorporating energy-efficient design and equipment into new and upgraded workshops such as:

- wall and ceiling insulation
- skylights
- LED or fluorescent lights
- solar hot water systems and air-conditioners
- variable-speed air compressors.

### Stormwater

Keep stormwater that flows across the site free from dust, litter, equipment parts and chemicals. Install litter traps in places where stormwater drains may become contaminated and divert 'clean' stormwater directly into drains.



## Pollution control measures

### Surface preparation

#### **Abrasive blasting**

Abrasive blasting is a common method of cleaning and preparing structures, heavy machinery, marine vessels and other objects before surface coating.

Abrasive blasting must be carried out in a way that prevents or minimises dust escaping from work areas and blasting waste and debris from contaminating soil or water.

Read the **Abrasive blasting** section of this guide for more advice.

#### **Chemical pre-treatment**

Chemical pre-treatment must be done in a way that prevents chemicals and wastes being released into stormwater drains or waterways and odour or noise becoming an unlawful nuisance.

Chemicals used in surface pre-treatment can contaminate soil, stormwater and surface water. These chemicals may be:

- poisonous to people and animals, for example chromate solutions
- high or low pH, e.g. acids and alkalis.

Read the **Anodising, electroplating and galvanising** and the **Storage of chemicals** sections of this guide for more advice.

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### Spray painting

Spraying paint and primer needs to be done in a manner that prevents toxic gases, odours and overspray particles escaping the workshop.

All spray painting should be done inside a spray booth or in a designated spray painting area designed, built and installed in accordance with *Australian Standards AS4114.1* and *AS4114.2* and Brisbane City Council requirements. Advice outlining environmental protection measures is provided under the **Designing a new spray painting workshop** section of this chapter. Keep the doors closed for a suitable time after painting to allow residual spray to settle or be extracted.

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#### **Booth maintenance and waste disposal**

Regularly maintain or replace spray booth filters to ensure they continue to remove particles effectively. Maintenance procedures should be documented. Read the **Environmental management systems** section of this guide for more advice.





Observing the tips below can help keep filters in good working order.

#### Wet filter

- Ensure water sprays function correctly.
- Ensure the make-up water float level is correct.
- Follow the manufacturer's recommendations when adding water and chemicals.

#### Dry (fibre) filter

- Ensure the filter is close-fitting and gap-free.
- Install and maintain the filter in accordance with the manufacturer's specifications.
- Keep spare filters on-site.

Ensure waste material is properly disposed. Collect accumulated sludge from wet filter systems for recycling or dispose using a licensed waste transporter. Bag or wrap old dry filters before disposal to prevent captured paint particles being released. Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.

#### Spray painting on location

Obviously, some items such as ships, aircraft, bridges and fixed structures are too large for a spray painting booth. A designated spray painting area should be established in accordance with *Australian Standards AS4114.1* and *AS4114.2*. Spraying paint and primer must still be done in a manner that prevents toxic gases, odours and overspray particles escaping and entering the air, soil, stormwater drains, waterways or neighbouring properties. Pollution control measures for open-air spray painting include the below.

- Do not spray paint on to the surrounding soil or into stormwater drains.
- Use temporary screens to fully enclose the spray painting activities on all sides, including above and below (e.g. if painting a structure such as a bridge). The screens should be capable of containing overspray within the spray painting area. Where the work cannot be roofed, the side screens need to be high enough to prevent overspray from escaping. For example, screens should extend at least two metres above the item being sprayed.

- Spray paint the item in a downward direction/manner where practical.
- Clean up all waste before it can:
  - be blown away
  - wash away or spill to drains and waterways
  - cause land contamination or harm to the environment.
- When spray painting a fixed structure, place a temporary screen underneath the item to collect overspray and prevent it from entering water or soil. The temporary screen should be made of antistatic material that is impervious and non-porous. It should be configured and installed in a way that prevents gaps or leaks.

Communicate with nearby residents or businesses when carrying out one-off, in-situ spray painting work, such as on a bridge or other structure. Provide neighbours with information about the proposed work to let them know where and when the job will be undertaken and how long it will take. Outline the potential impacts and explain the preventative environmental measures planned.



Provide direct contact details (a hotline) to the work site so that concerns from the local community can be addressed immediately.

Clear, timely communication with people who could be impacted may limit the number of complaints, meaning fewer disruptions to the job.

### **Choosing spray guns**

Spray guns with a high transfer efficiency offer numerous environmental and cost benefits. For example, they:

- use less paint, which cuts costs
- reduce the need to change spray booth filters as frequently
- reduce VOC emissions
- reduce odours.

A spray gun with a transfer efficiency of at least 65%, such as a high-volume, low-pressure (HVLP) spray gun, will reduce odour emissions.

### **Cleaning spray guns**

Water-based paints can be cleaned with water, which eliminates the need for a solvent. Installing a gun wash machine with recycling capabilities can reduce the amount of solvent used when cleaning guns used for traditional paints, cutting purchasing and disposal costs.

Solvent recycling systems remove the suspended solids from the gun wash solvent and separate the clean solvent from the waste solids. The waste paint can be collected for easy disposal while the recovered solvent can be recycled through the gun wash machine.

Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.

### **Conducting priming and touch-up work**

Small priming or touch-up jobs may be done outside of the spray booth, provided:

- the paint or primer does not contain isocyanates
- the application rate for the paint is less than one litre per hour
- the area to be painted requires a maximum of 0.1 litre of surface coating material
- the work is undertaken in a designated spray painting area.

Advice outlining environmental protection measures is provided under the **Designing a new spray painting workshop** section of this chapter.

If spray painting (including priming and paint touch-ups) is done outside a spray booth, the business must ensure overspray and odours do not leave the worksite.



## Paints

### Choosing paints

Paint odours can be reduced substantially by using high-solid, water-based paints. Water-based paints generally contain significantly less VOCs compared to traditional solvent-based paints.

High-solid, water-based paint has many other advantages, including those listed below.

- It needs fewer coats to produce the same coverage as non high-solid paints. This saves money and means less paint must be stored in the workshop.
- The lower VOC content reduces odours and fire risk.

### Storing paints and solvents

All products used in surface coating such as paints, thinners, primers and preparation solvents should be stored securely. Spills, leaks and drips should be prevented from entering the soil, stormwater drains and waterways.

Chemicals need to be stored in:

- a paint mixing room that is designed and built in accordance with *Australian Standards AS4114.1* and *AS4114.2* (read the **Designing a new spray painting workshop** section of this chapter for further advice)
- an area that meets the requirements outlined in the **Storage of chemicals** section
- an area protected from vehicle traffic and accidental damage
- closed containers to prevent the release of fumes and odour.

It is important to provide spill clean-up equipment within easy reach of the paint storage area to enable the fast and effective recovery. The equipment needs to be accessible and unobstructed at all times.

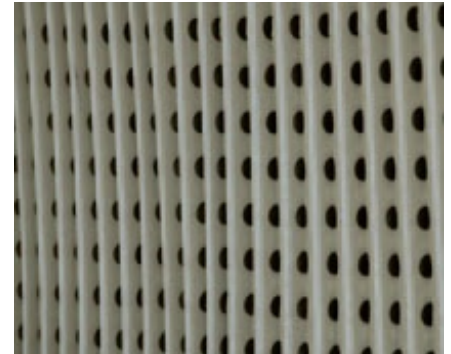
Any paint, gun wash or solvent spills should be cleaned up and disposed of as soon as they are detected to reduce the risk of water or soil contamination. This should be documented in spill clean-up procedures for the workshop.

The maximum quantity of flammable liquids that should be stored in a workshop is indicated in *Australian Standard AS1940: Storage and handling of flammable and combustible liquids*. See the **Storage of chemicals** section for further advice.





A spray booth.



A dry (fibre) filter.



Gun wash solvent recycling equipment.

## Waste disposal

Spray painting waste may be classified as regulated waste under the *Environmental Protection Act 1994* depending on what it contains. Managing and disposing of regulated wastes is subject to specific regulatory requirements. Waste such as accumulated sludge from wet filter systems may require laboratory testing to check whether it is regulated waste. For a full list of regulated wastes, refer to **Schedule 7 of the *Environmental Protection Regulation 2008***.

Store waste paints, thinners and solvents in covered containers either for recycling or for disposal using a licensed waste transporter. Keep records as proof of proper disposal.

Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.

## Workplace health and safety considerations

Workplaces must comply with the *Work Health and Safety Act 2011*. Consult the *Spray Painting and Powder Coating Code of Practice 2013*, approved under the *Work Health and Safety Act 2011*. For more information call Workplace Health and Safety Queensland on 1300 369 915 or refer to [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

## Inspection and maintenance programs

Routinely inspect all environmental control components, for example, at least weekly. This will help identify any potential problems before they occur. Use a checklist incorporating suggested requirements from this guide.

Documenting inspection and maintenance procedures for pollution control equipment, training staff in the procedures and undertaking a regular and effective site-specific inspection and reporting program can greatly assist in demonstrating compliance with the general environmental duty of the *Environmental Protection Act 1994*.

Read the **Environmental management systems** section of this guide for more advice.

## Training and procedures

Documenting all spray painting procedures for environmental protection and training staff in the procedures demonstrates due diligence has been taken to prevent or minimise environmental harm.

Read the **Environmental management systems** section of this guide for more advice.

# 5 Powder coating

## Environmental impacts

The powder used in powder coating is very fine. If it escapes, it can cause a dust problem for nearby workers and residents, affecting their health and well-being. This prescribed water contaminant can also pollute waterways. If swept, hosed or left to be washed by rain into stormwater drains, the powder can contaminate the soil, kill aquatic plants and animals, degrade local creeks and Moreton Bay and impact on recreational fishing and swimming.

Liquid chemicals used to prepare surfaces before powder coating, such as chromate solutions, can contaminate soil, stormwater and waterways if they escape the workshop.

Contaminating the soil or groundwater around a business not only damages the environment but can also reduce the property's value. Contaminated sites require expensive remediation to make them safe for people, plants and animals.

Noises from powder coating activities can become a nuisance for neighbours, especially noise from cutting, grinding and hammering metal and plant and equipment such as extraction systems, compressors and pumps.

## Pollution control measures

### Surface preparation

#### *Abrasive blasting*

Abrasive blasting is a common method of cleaning and preparing structures, heavy machinery, marine vessels and other objects before surface coating.

Abrasive blasting must be carried out in a way that prevents or minimises dust escaping from work areas and blasting waste and debris from contaminating soil and water.

Read the **Abrasive blasting** section of this guide for more advice.

#### *Chemical pre-treatment*

Chemical pre-treatment must be conducted in a way that prevents chemicals and wastes being released to stormwater drains or waterways and odour or noise becoming a nuisance for residents.

Chemicals used in surface pre-treatment can contaminate soil, stormwater and surface water.

These chemicals may be:

- poisonous to people and animals, for example chromate solutions
- high or low pH, e.g. acids and alkalis.

Read the **Anodising, electroplating and galvanising** and the **Storage of chemicals** sections of this guide for more advice.

### Powder application

Powder application should be done within a purpose-built booth. Fit the booth with dust extraction equipment capable of capturing all excess powder and preventing it escaping the booth and workshop. The booth may be either fully enclosed, three-sided or a local exhaust ventilation system for smaller items. *Australian Standard AS3754: Safe application of powder coatings by electrostatic spraying* provides guidance about powder booth configurations, extraction rates and worker safety.

Suitable dust extraction equipment includes a wet filter, textile or cartridge filter and/or a cyclone filter.



### Booth design

Seek the design advice of an air quality consultant to ensure appropriate dust extraction performance, stack heights and flue velocities. Position booths and designated powder coating areas away from air drafts and ventilation in the workshop that could disperse airborne powder.

### Booth maintenance

Regularly maintain or replace the powder coating booth filters to ensure they continue to remove particles effectively. Maintenance procedures for the booth and filters should be documented. Read the **Environmental management systems** section of this guide for more advice.

Observing the following tips can help keep filters in good working order.



### Wet filter

- Ensure water sprays function correctly.
- Ensure the make-up water float level is correct.
- Follow the manufacturer's recommendations when adding water and chemicals.

### Dry (fibre) filter

- Ensure the filter is close fitting and gap free.
- Install and maintain the filter in accordance with the manufacturer's specifications.
- Keep spare filters onsite.

Ensure waste material is properly disposed. Collect accumulated sludge from wet filter systems for recycling or dispose using a licensed waste transporter. Bag or wrap old dry filters before disposal to prevent captured particles being released. Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.

### Maintenance of dust extraction equipment

Dust extraction systems only work effectively if they are properly maintained. Follow the manufacturer's instructions. Inspect the dust extraction system regularly (e.g. at least weekly). Any detected leaks should be repaired immediately. Document all maintenance procedures (including the maintenance schedule) and train staff in the procedures. Keep all maintenance records to demonstrate measures are being taken to prevent dust emissions. Read the **Environmental management systems** section of this guide for more advice.

Use local exhaust ventilation to prevent or minimise dust being generated when opening powder coating packages, filling hoppers, reclaiming powder, and during clean-up. Consider the layout of the work station and the size of the hopper opening to minimise dust when filling a hopper. Use mechanical powder transfer rather than manual methods, particularly if the powder coating is supplied in drums.



## Curing

Curing takes place in an oven that can be expensive to run. Simple strategies, combined with good planning, can reduce these energy needs and save money.

- Consider using the oven for multiple steps in the coating process simultaneously. The oven may be used for drying items that have been through a surface preparation rinse as well as for curing the powder coating.
- Follow the manufacturer's instructions to avoid heating the oven too hot or for too long.
- Plan the work program and flow carefully so the oven is not operating unnecessarily while not in use.

## Cleaning

Clean up powder coat dust in the workshop as part of the regular housekeeping routine.

Vacuum workshop floors regularly (e.g. twice daily). This will stop dust from blowing across nearby homes and businesses or being tracked out of the workshop on tyres and on to the street, where it can wash into drains. Spills should be cleaned up immediately.

Document procedures and schedules for cleaning powder coat material from floors, equipment, dust extraction and spray booths and train staff in the procedures. Read the **Environmental management systems** section of this guide for more advice.

## Waste disposal

Dust collected from cleaning floors and waste powder from dust extraction systems should be carefully bagged, sealed and placed in a waste bin. Consider baking waste powder in the original box and disposing it as a solid waste to landfill.

Spent filters should be bagged or wrapped before placing them in a waste bin to prevent dust escaping.

Waste from certain activities, such as abrasive blasting and accumulated sludge from wet scrubber systems may be classified as regulated waste under the *Environmental Protection Act 1994*. Laboratory testing may be required to check what the waste contains. Managing and disposing of regulated wastes is subject to specific regulatory requirements. For a full list of regulated wastes, refer to **Schedule 7 of the Environmental Protection Regulation 2008**.

Use a licensed waste transporter to dispose of regulated waste and keep records as proof of proper disposal.

Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice.





## Location of noisy equipment

Carefully consider where to place noisy equipment such as air compressors and dust extraction systems. Ideally, noisy equipment should be inside the workshop or within an acoustic enclosure.

Check the manufacturer's noise label, fixed to the equipment, to find out how much sound it makes in decibels. Compare labels and buy the quietest item.

Read the **Noise management** section of this guide for more advice.

## Energy efficiency

Build in ongoing cost savings by incorporating energy-efficient design and equipment into new and upgraded workshops such as:

- wall and ceiling insulation
- skylights
- LED or fluorescent lights
- solar hot water systems and air-conditioners
- variable-speed air compressors.

## Stormwater

Surface preparation activities such as abrasive blasting and chemical treatment can create contaminated runoff.

Keep stormwater that flows across the site free from dust, litter, equipment parts and chemicals. Install litter traps in places where stormwater drains may become contaminated and divert clean stormwater directly into drains. Do not hose workshop floors onto the surrounding soil or into stormwater drains.

## Workplace health and safety considerations

Workplaces must comply with the *Work Health and Safety Act 2011*. Consult the *Spray Painting and Powder Coating Code of Practice 2013*, approved under the *Work Health and Safety Act 2011*. For more information call Workplace Health and Safety Queensland on 1300 369 915 or refer to [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

## Inspection and maintenance programs

Routinely inspect all environmental control components, for example, at least weekly. This will help identify any potential problems before they occur. Use a checklist incorporating suggested requirements from this guide.

Documenting inspection and maintenance procedures for pollution control equipment, training staff in the procedures and undertaking a regular and effective site-specific inspection and reporting program can greatly assist in demonstrating compliance with the general environmental duty of the *Environmental Protection Act 1994*.

Read the **Environmental management systems** section of this guide for more advice.

## Training and procedures

Document all powder coating procedures for environmental protection and train staff in the procedures to demonstrate due diligence has been taken to prevent or minimise environmental harm.

Read the **Environmental management systems** section of this guide for more advice.

# 6 Anodising, electroplating and galvanising

## Environmental impacts

Anodising, electroplating and galvanising must be done in a way that prevents chemicals and wastes being released to stormwater drains, waterways and the air or noise becoming a nuisance for residents.

Chemicals used in these activities can contaminate soil, stormwater and surface water. Some may be poisonous to people and animals, for example, chromate solutions, acids and alkalis. If these substances are swept, hosed or left to be washed by rain into stormwater drains, they can contaminate the soil, kill aquatic plants and animals, degrade local creeks and Moreton Bay, impact on recreational fishing and swimming and pass up the food chain to humans.

Contaminating the soil or groundwater around a business not only damages the environment but can also reduce the property's value. Contaminated sites require expensive remediation to make them safe for people, plants and animals.

Anodising, electroplating and galvanising can all produce chemical odours and fumes, which can affect the health and wellbeing of people in neighbouring businesses and homes.

Operating in a way that minimises waste can reduce the chance of pollution, improve resource efficiency and reduce waste disposal costs.

## Pollution control measures

### *Delivery of chemicals*

Areas where goods are handled carry a higher contamination risk than other workshop spaces. Minimise the chance of polluting the environment when bulk liquids are delivered by incorporating protection measures into loading and unloading spaces. Clearly mark these areas so staff and delivery drivers know where loading and unloading should take place. Develop instructions to guide the process.

Isolate loading and unloading areas from the stormwater system during handling activities so spills do not leak into the system. Roofing the loading and unloading area will keep rain out. If isolation valves are used (whether they are manual or automatic), clear and concise work procedures will ensure staff carry out the appropriate checks and that all valves are closed during loading or unloading. Fit automatic cut-off valves to delivery pipes to prevent overfilling and regularly check and maintain filling and transfer equipment.

Provide a spill kit that is easy to access so leaks and spills can be contained during transfer. Ensure staff are aware of the spill control procedures. Refer to the **Storage of chemicals** sections of this guide for advice on emergency preparation and planning and the **Environmental management systems** section for advice on work procedures.



## Storage areas for chemicals

Hazardous chemicals used by, or generated through, anodising, electroplating and galvanising activities can damage the environment and harm people if poorly stored, used or disposed of. When working with hazardous chemicals, consider the following:

- workplace health and safety requirements
- storage areas, quantities and handling
- segregation
- vapour hazards
- emergency preparation and planning
- waste disposal.

Chemicals, including waste chemicals, should be stored in a dedicated, bunded area or compound, which meets the requirements of the **Storage of chemicals** section of this guide, to minimise environmental impacts.

## Dipping tanks

All process tanks, baths, vessels and pipes should be located on a sealed concrete floor, free of cracks and crevices, to prevent pollutants contaminating the soil and groundwater beneath the business.



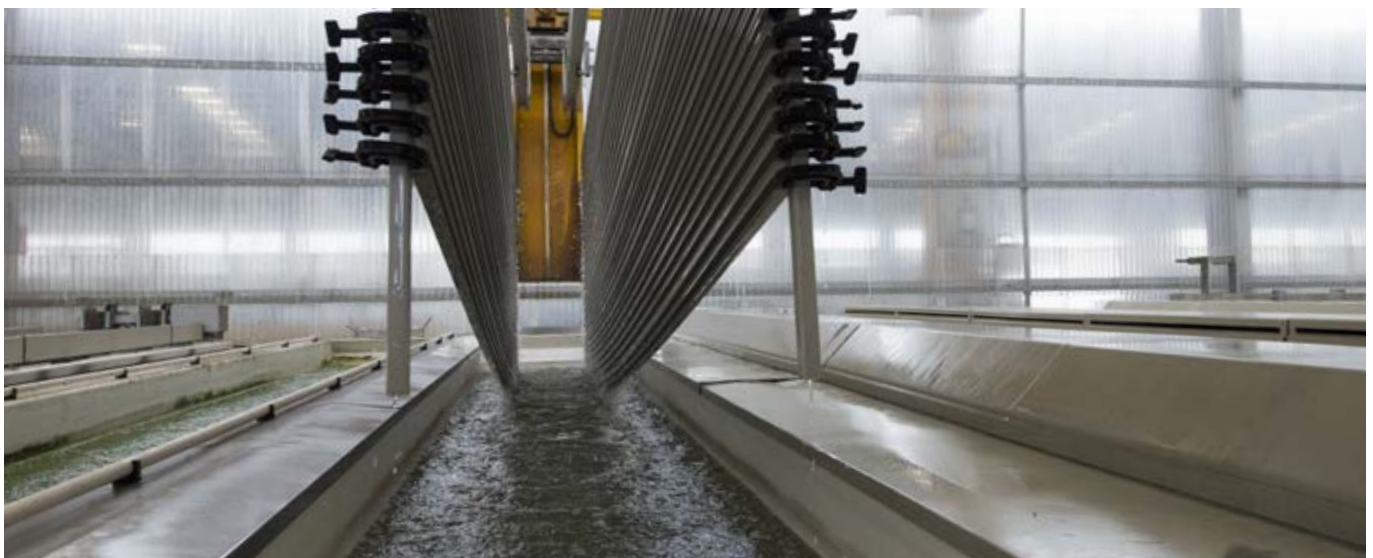
Design the external perimeter of the dipping tank area to contain spilt liquids and allow for easy clean-up. Use drive-over bunding, kerbing and drainage channels to keep liquids from leaking out of doors and entrances.

Routinely check process tanks and bunds for structural integrity. Consider using alarms that are based on conductivity bridges to detect spills, leaks and process accidents. These can alert staff for prompt corrective action. Regularly check all instrumentation to validate its functionality.

Drain boards fitted between the tanks, which will divert any drippings back to the respective tanks, can save raw materials and minimise pollution caused from spillage and rinse water.

Do not hose the workshop floor or hose chemicals or wastes onto the surrounding soil or the stormwater drains. Keep stormwater out of the workshop.

Develop a chemical management/spill response plan. Read the **Environmental management systems** and the **Storage of chemicals** sections of this guide for more advice on spills, procedures and records.





Extraction systems only work effectively if they are properly maintained. Follow the manufacturer's instructions. Inspect the extraction system regularly (e.g. at least weekly) and repair any defects. Document maintenance procedures and schedules, and train staff in the procedures. Keep all maintenance records to demonstrate measures are being taken to prevent vapour or fume emissions. Read the **Environmental management systems** section of this guide for more advice on procedures and records.

## Waste disposal

When carrying out galvanising in a molten zinc bath, minimise ash formation on the surface of the galvanising tank by using the dry flux process. Double rinse after acid washing to minimise iron carryover into the flux and galvanising tanks, and minimise immersion time in the galvanising tank.

Ash and dross removed from the galvanising tank must be disposed of by a licensed waste transporter. 'Runs' and 'dags' can be removed from galvanised items by pneumatic or mechanical means. This process will produce zinc dust, which can be reclaimed by cyclones or bag filters for recycling.

Spent tank solutions, sludge from process tanks and accumulated sludge from wet scrubber systems may be classified as regulated waste under the *Environmental Protection Act 1994*, depending on what it contains. (Laboratory testing may be required to check.) Managing and disposing of regulated wastes is subject to specific regulatory requirements. For a full list of regulated wastes, refer to Schedule 7 of the *Environmental Protection Regulation 2008*.

Use a licensed waste transporter to dispose of regulated waste and keep records as proof of proper disposal.

## Chemical management

Regularly check all solution temperatures and concentrations. Maintain them within recommended working limits to optimise chemical usage and minimise fume formation.

Run chemical baths at the lowest practical concentrations to reduce the amount of chemical carried forward to rinse water. Minimise 'drag out', which pulls needed chemicals out of a process bath, and 'drag in', which affects the purity and effectiveness of the next process bath. All racks of items should be allowed sufficient time to drain while still positioned over the tank. Time to drain should be programmed into an automated dipping system. If manual controls are used, provide instructions and training for staff to ensure they allow adequate draining time. Provide a timer or clock so staff can easily measure the draining time required. These simple procedures can save large volumes of the solutions used in the dipping process.

When using multiple rinse tanks, use a cross-flow technique, which allows the final rinse water to be reused as initial rinse. Use flow controllers in the water lines to the rinse tanks. This will save water and reduce the amount of water to be treated.

Insulate heated tanks and cover them when they are not in use to minimise heat loss. Cover hot chemical tanks with floating balls, foam or floating insulation pillows to minimise heat loss, evaporation, spillages and splashing as items enter and leave the process tanks.

## Air quality protection

Chemical gases harmful to human health and Brisbane's air quality are released through the dipping and galvanising processes. Provide extraction and ventilation near the top of chemical tanks to capture gases and vapours. The galvanising molten zinc bath should have an extraction system fitted with filters to prevent gases, odours and particles escaping from the workshop. Seek the design advice of an air quality consultant to ensure appropriate extraction performance, filter performance, treatment, stack heights and flue velocities.





Read the **Waste management, resource recovery and resource efficiency** section of this guide for more advice. Read the **Storage of chemicals** section of this guide for more advice about the storage requirements of waste chemicals.

## Trade waste

The release of waste by a business in Brisbane into the sewerage system may require a permit from Queensland Urban Utilities.

For more information call Queensland Urban Utilities on 13 26 57 or refer to [www.urbanutilities.com.au](http://www.urbanutilities.com.au)

## Location of noisy equipment

Carefully consider where to place noisy equipment such as air compressors and vapour extraction systems. Ideally, noisy equipment should be inside the workshop or within an acoustic enclosure.

Check the manufacturer's noise label, fixed to the equipment, to find out how much sound it makes in decibels. Compare labels and buy the quietest item.

Read the **Noise management** section of this guide for more advice.

## Energy efficiency

Build in ongoing cost savings by incorporating energy-efficient design and equipment into new and upgraded workshops such as:

- wall and ceiling insulation
- skylights
- LED or fluorescent lights
- solar hot water systems and air-conditioners
- variable-speed air compressors.

## Workplace health and safety considerations

People who are directly exposed to hazardous chemicals or come in contact with contaminated soil or water can become very sick. Surface coating workshops must comply with the storage and handling requirements of the *Work Health and Safety Act 2011*.

Fire prevention and worker safety are important considerations that need to be integrated into the storage, use and disposal of chemicals. Workplace Health and Safety Queensland publish a range of useful guides to assist in addressing these issues. Go to [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

## Inspection and maintenance programs

Routinely inspect all environmental control components, for example, at least weekly. This will help identify any potential problems before they occur. Use a checklist incorporating suggested requirements from this guide.

Documenting inspection and maintenance procedures for pollution control equipment, training staff in the procedures and undertaking a regular and effective site-specific inspection and reporting program can greatly assist in demonstrating compliance with the general environmental duty of the *Environmental Protection Act 1994*.

Read the **Environmental management systems** section of this guide for more advice.

## Training and procedures

Document all procedures for environmental protection and train staff in the procedures to demonstrate due diligence has been taken to prevent or minimise environmental harm.

Read the **Environmental management systems** section of this guide for more advice.

# 7 Storage of chemicals

## Environmental impacts

Hazardous chemicals used by, or generated in, surface coating workshops can damage the environment and harm people if poorly stored, used or disposed of.

Oils, paints, thinners and other liquid chemicals that enter stormwater drains can kill aquatic plants and animals, degrade local creeks and Moreton Bay, impact on recreational fishing and swimming, accumulate in the environment and be passed up the food chain to humans. Persistent chemicals become widely distributed and are recirculated throughout the environment. Gases and fumes from volatile solvents can pollute the air, exacerbate photochemical smog and also damage people's health.

Flammable vapours from fuels and solvents are a fire risk. If they accumulate in voids, they can explode. Fires involving chemicals release toxic smoke into the air and toxic firewater into waterways, making them one of the most significant potential causes of environmental harm.

Chemicals that leak into soils can accumulate and seep into waterways or groundwater. Contamination of soil or water caused by poor storage or handling practices, or a chemical fire, can result in prosecution and fines. Contaminated land can limit future development options of the site, affect property values and is generally very expensive to remediate.

## Workplace health and safety considerations

People who are directly exposed to hazardous chemicals or come in contact with contaminated soil or water can become very sick. Surface coating workshops must comply with the storage and handling requirements of the *Work Health and Safety Act 2011*.

## Storage quantities

Chemicals should be ordered in the smallest practical quantity for the application and within all regulated storage quantity limitations. Do not let surplus chemicals accumulate indefinitely. If there is no likelihood of their use, they should be scheduled for disposal.

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This guide primarily focuses on ways to store and handle small quantities of chemicals. Storing larger quantities may require additional precautions in order to comply with the *Environmental Protection Act 1994* and the *Work Health and Safety Act 2011*. For example, chemicals may need to be stored in approved cabinets or package stores constructed in compliance with Australian Standards for specific classes of dangerous goods. Check the requirements at [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

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**Table 2: Minor storage quantities for common classes of hazardous chemicals**

CHEMICAL TYPE	INSIDE WORKSHOP	OUTSIDE WORKSHOP
<b>CLASS 3: FLAMMABLE LIQUIDS AND COMBUSTIBLE LIQUIDS</b>		
Flammable liquid Packing Group II: <ul style="list-style-type: none"> <li>petrol</li> <li>methanol</li> <li>ethanol.</li> </ul>	1 L per 2 m <sup>2</sup> floor space with maximum of 250 L	Attached shed: 250 L Outside or in detached shed: 1 L per 2 m <sup>2</sup> floor space with maximum of 250 L
Flammable liquid Packing Group III: <ul style="list-style-type: none"> <li>kerosene</li> <li>turpentine.</li> </ul>	1 L per 1 m <sup>2</sup> floor space with maximum of 500 L	Attached shed: 1 L per 1 m <sup>2</sup> floor space with maximum of 500 L Outside or in detached shed: 1400 L in tanks not over 700 L each or in packages
Combustible liquids C1, C2: <ul style="list-style-type: none"> <li>diesel.</li> </ul>	4 L per 1 m <sup>2</sup> floor space with maximum of 2000 L	Attached shed: 2500 L Outside or in detached shed: 5000 L
<b>CLASS 5: OXIDISING SUBSTANCES</b>		
Packing Group I	50 kg or L	Not applicable
Packing Group II	250 kg or L	Not applicable
Packing Group III	1000 kg or L	Not applicable
<b>CLASS 6: TOXIC SUBSTANCES</b>		
Packing Group I	10 kg or L	Not applicable
Packing Group II	100 kg or L	Not applicable
Packing Group III	1000 kg or L	Not applicable
<b>CLASS 8: CORROSIVE SUBSTANCES</b>		
Packing Group I	50 kg or L	Not applicable
Packing Group II	250 kg or L	Not applicable
Packing Group III	1000 kg or L	Not applicable
<b>MIXED CLASSES OF DANGEROUS GOODS (total quantity of all dangerous goods)</b>		
Packing Group I	50 kg or L	Not applicable
Packing Group II	250 kg or L	Not applicable
Packing Group III	1000 kg or L	Not applicable

## Storage areas for chemicals

Chemicals, including waste chemicals, should be stored in a dedicated, bunded area or compound that is capable of retaining any spilt liquids.

These storage areas should be labelled with details of what can be stored in them. Fit relevant warning signs at access points to dedicated stores.

Structurally, a good chemical storage area should have:

- good ventilation, such as vents in the walls and ceiling, or open windows to keep the store cool and prevent the build-up of fumes or gases that may affect the health of workers or cause a risk of explosion
- solid walls and roof to protect the contents of the store from wind and rain
- good lighting
- separate shelving or individual cabinets for storing items that should not be stored together
- a lock on the door.

The bunding should incorporate the design features listed below.

- It should be liquid-tight and chemically-resistant for the type of liquid contained (some chemicals can permeate concrete and brick and dissolve seals and joints). Bunding is commonly built from solid concrete or brick walls treated to be liquid-tight.
- While bunding can generally be constructed in position, commercial pallet bunding units can be used for minor chemical storage needs.
- Bunded areas need to be large enough to hold the contents of the largest container stored inside the bund plus 25% of its volume<sup>2</sup>.

- If workshop walls and floor are well sealed, the storage area can be bunded with a small concrete lip across all doorways. Ensure the bund is marked well so it does not become a trip hazard.
  - All bunds need to be regularly maintained, checked for cracks and leaks, and kept free of unnecessary materials.
  - Drain and pump-out valves need to be locked in the closed position.
  - Outdoor bunded areas need to be roofed and isolated from stormwater runoff to prevent rain entering the area and causing pollutants to overflow or metal drums to rust.
- emergency information (safety and environmental advice)
  - name of the manufacturer
  - date of manufacture.
- Make sure staff read the labels on all the chemical products they use and are adequately trained in their use.

## Safety data sheets (SDS)

A SDS is an information sheet about the safe handling, storage, transport and disposal of a material. Refer to a chemical's SDS to find out:

- the name of the chemical and its product code
- key ingredients
- physical description and properties
- hazard information
- how to store the chemical
- how to handle the chemical and what personal protective equipment may be required
- what to do in case of an emergency such as a spill.

The information on the SDS can save lives in an emergency. When chemicals are received, complete the following steps.

- Check that every chemical product purchased or used comes with an SDS. If the SDS is missing, source it from the supplier.
- Make the SDS register readily accessible and up-to-date.
- Train staff on the safe use of all chemicals and ensure they read the labels of all chemical products they use.

The Workplace Health and Safety Queensland website also has some useful publications on managing chemical hazards in the workplace. See [www.worksafe.qld.gov.au](http://www.worksafe.qld.gov.au)

## Handling of chemicals

Good chemical management and handling practices reduce the risk of a spill or contamination. Essential practices include those listed below.

- Keep an up-to-date list of the types and volumes of chemicals being stored. All chemicals should be quickly identifiable.
- Ensure all containers of hazardous chemicals are clearly labelled with details of what they contain and any hazard they pose. Containers need to be properly labelled from the time they come on to the premises to when they are removed for disposal.

Labels on chemical products help to identify the product, its ingredients, and hazards or dangers. They also contain important health and safety information. Most manufactured chemicals come labelled with details on:

- the name of the chemical
- ingredients and their concentration (strength)
- information about hazards associated with the chemical

<sup>2</sup> Australian Standard AS 1940: *The storage and handling of flammable and combustible liquids*

## Segregation of chemicals

Chemicals belong to specific categories and must be stored, segregated or separated according to their compatibility. This ensures they cannot accidentally come into contact with each other and cause a reaction such as a fire, explosion or release of toxic or flammable gases or vapours. Always check the label or refer to the SDS to confirm which category a chemical belongs to and its compatibility. There are several common categories, outlined below.

*Australian Standard AS3833* contains information about storing mixed classes of dangerous goods. Always consult this standard when mixed classes of dangerous goods are kept on site.



### Flammable chemicals

Chemicals such as petrol, turpentine, paints, thinners and many solvents are highly volatile and flammable, and need to be kept away from heat and substances that might cause them to ignite or explode. Small quantities of paints and thinners are best stored in a designated paint mixing room, designed in accordance with *Australian Standard AS4114*. Small quantities of other flammable liquids are best stored in a specially designed cabinet. See *Australian Standard AS1940: The storage and handling of flammable and combustible liquids* for specific requirements.



### Oxidising substances

Oxidising chemicals quickly and easily react with other chemicals. They should only be stored with other oxidising chemicals. Examples are calcium hypochlorite (swimming pool chlorine), sodium peroxide and methyl ethyl ketone peroxides (MEKP). See *Australian Standard AS4326: The storage and handling of oxidising agents* for specific storage and handling requirements.



### Corrosive chemicals

Chemicals such as acids can corrode substances including inappropriate containers and temporary bunding. They can also react violently and explosively if they come into contact with other types of chemicals. See *Australian Standard AS3780: The storage and handling of corrosive substances* for specific storage and handling requirements.



### Toxic chemicals

Toxic chemicals are poisonous to people and ecosystems. Chemical fires involving toxic substances pose a particularly high risk. Toxic chemicals should be separated from other classes of fire-risk chemicals. See *Australian Standard AS4452: The storage and handling of toxic substances* for specific requirements.

## Good storage and handling practices

When dealing with hazardous materials, all activities, repairs, servicing etc. should be carried out under cover. Always wear the recommended protective gear such as gloves, eyewear and a mask when handling chemicals. Access to storage areas should be kept clear and stores need to be kept free of extraneous materials.

Containers need to be routinely inspected. If signs of a spill, leak or deterioration are observed, the suspect package needs to be examined and made safe.

Minimise the movement of chemicals as much as possible. Containers should be handled with care to minimise the risk of leaks. Examine chemical packaging immediately before handling. Look for leaking containers, loose lids and torn cartons. Do not transport open or leaking containers. Care needs to be taken when decanting or transferring chemicals. Hand-pouring should be avoided. Dispensing pumps or self-closing metal taps should be used in order to reduce the hazards of splash, spillage or escape of vapours. Funnels can be used where hand-pouring is unavoidable.

## Paint mixing rooms

Paint mixing rooms can be used to store all paints, thinners, hardeners, gun wash and all other similar liquid chemicals. The paint mixing room must be designed, built and installed in accordance with *Australian Standards AS4114.1*. It should also be bunded and ventilated to contain any potential spills.

The items listed below can help reduce environmental risks.

- Store liquids in a bunded and covered area, isolated from stormwater run-off.
- Store all chemicals, and liquid waste awaiting collection, offsite in a bunded and covered area well away from onsite vehicles.
- Seal all drums and containers, store them upright and remove them as soon as possible.
- Inspect storage containers regularly and replace rusted and damaged containers.
- Make it easy to access and inspect stored chemicals.
- Store different chemical types in separate containers, with adequate separation between non-compatible chemicals or materials.

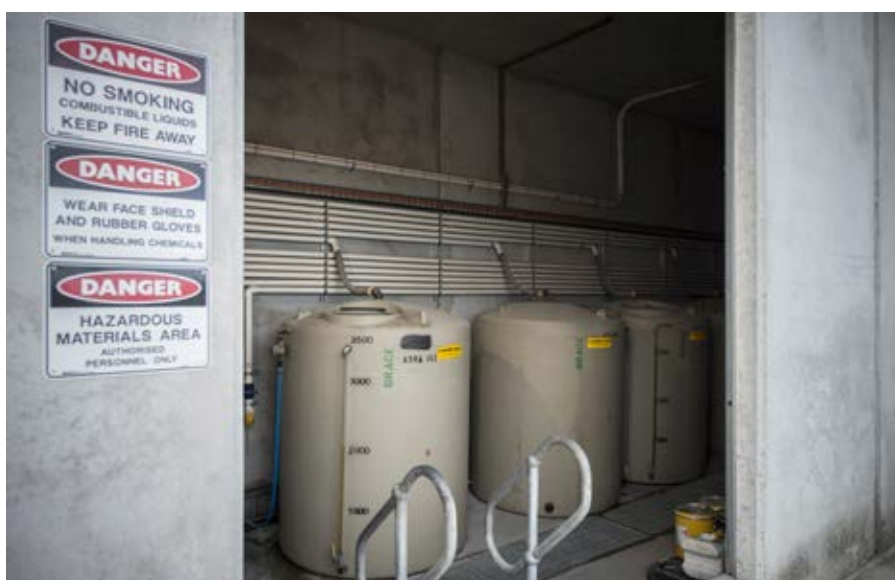
- Clearly label containers with the name of the chemical it contains.
- Keep an up-to-date register of all chemicals onsite, including safety data sheets for each chemical.
- Where chemicals are in constant use, place drip trays beneath the container to catch any leakage.
- Prevent leaks and spills by regularly maintaining equipment and handling it carefully.
- Place spill kits in areas where chemicals are stored or handled.
- Ensure spill kits contain the appropriate materials for the chemicals they may be used to contain.
- Make sure all staff are aware of the potential hazards posed by chemicals on site.

## Vapour hazards

Solvents and volatile chemicals such as paint, thinners and gun wash evaporate into the atmosphere. Chemical gases harmful to human health and Brisbane's air quality are released in the process.

Minimise evaporation by:

- storing solvents away from heat, naked flames and direct sunlight
- only decanting and dispensing volatile chemicals where there is adequate ventilation
- storing solvents in a sealed container with a tap to avoid the need to pour
- keeping containers closed when they are not in use
- replacing more volatile chemicals with water-based or biodegradable options, wherever possible
- wearing the personal protective equipment recommended on the SDS, such as gloves, protective eyewear and respiratory gear, when handling solvents
- cleaning up all spills quickly.



## Emergency preparation and planning

Developing a chemical management/spill response plan reduces the risk of committing an environmental offence. It may also reduce liability if an offence does occur by providing evidence of responsible operational practices.

This document can be small and simple, and sit as part of workplace health and safety materials. All procedures should be documented, from the clean-up of leaks and spills to the disposal of waste.

Prepare and practise the spill clean-up plan. Staff should know what to do, where to find emergency equipment and how to use it. Make sure staff members are aware of emergency telephone numbers to call in the case of a spill. A template of emergency contacts is included in this guide. Clear signs outlining spill clean-up procedures and emergency contact numbers should be prominently displayed onsite.

Keep spill response materials (for example, a spill kit) on hand at all times. The contents may include some or all of the following:

- booms to contain liquid
- material to block drains
- material to absorb spills
- broom and shovel
- pans, buckets and containers
- personal protective equipment such as a mask, chemically-resistant boots, gloves and a simple respirator.

## Basic response to spills

The following steps can be used to form the basis of an emergency response plan.

1. Address the source of the spill immediately ONLY if safe to do so. Consider the risks to personal safety and the environment (e.g. volatility, flammability, toxicity). For major spills, or where public safety matters are involved, call the Queensland Fire and Rescue Service on 000.
2. Where safe to do so, proceed with clean-up as directed by workshop procedures. It is important to clean up all spills quickly – even small ones – as they can easily flow or be washed into waterways or stormwater drains.
3. Use the materials in the spill kit to contain the spill and control its flow. If necessary, stop the spill from entering drains and waterways by using absorbent booms, plastic drain covers or blocking the stormwater drain inlets through other means. Under no circumstances should the chemical spill be hosed down a drain.
4. Smaller quantities of spilt or leaked materials can be absorbed and swept up into containers ready for disposal. Larger quantities of contained liquid waste may be pumped out or drained by a licensed waste transporter. All regulated wastes must be removed from site by a licensed waste transporter. Keep waste transport dockets onsite as future evidence of disposal.

5. If a spill that causes or threatens harm to the environment occurs, notify Brisbane City Council or the Department of Environment and Heritage Protection as soon as possible. This is a legal requirement of the *Environmental Protection Act 1994*.

## Disposal of waste chemicals

Please refer to the **Waste management resource recovery and resource efficiency** section of this guide.

## Further information

Department of Environment and Heritage Protection Hotline – phone 1300 130 372 or visit [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

Standards Australia – phone 131 242 or visit [www.standards.org.au](http://www.standards.org.au) for copies of relevant Australian Standards

Yellow Pages – [www.yellowpages.com.au](http://www.yellowpages.com.au) look under 'Chemical Spill Equipment', 'Waste Reduction and Disposal Services' and 'Environmental and Pollution Consultants'

Queensland Fire and Rescue Service [www.fire.qld.gov.au](http://www.fire.qld.gov.au)

Fire Protection Association Australia [www.fpa.com.au](http://www.fpa.com.au)

# 8 Waste management, resource recovery and resource efficiency

## Environmental impacts

Surface coating workshops generate solid waste such as car parts, broken glass, sandpaper, empty paint and solvent containers, used spray-booth filter media, plastics, paper, cardboard, metal fillings and sanding dust. Liquid wastes include automotive liquids such as oil and engine coolant, used cleaning solvents and wastewater from cleaning activities.

If not carefully disposed of, solid and liquid waste can enter stormwater drains and contaminate soil, groundwater and waterways.

Contamination of local waterways can harm aquatic life and reduce recreational fishing, swimming and amenity values of local creeks, the Brisbane River and Moreton Bay.

## Managing wastes

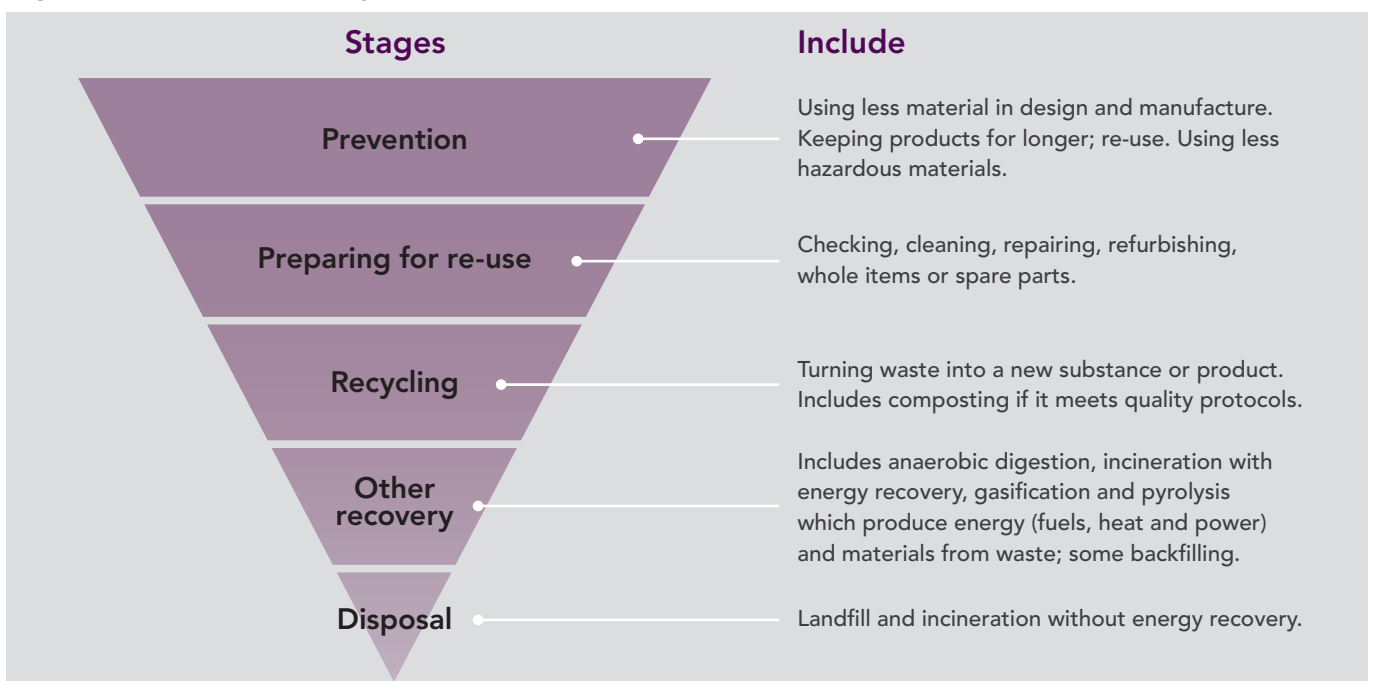
Waste disposal can be expensive. Poor waste management reduces the efficient use of material resources, further increasing costs. Businesses able to reduce their waste can enjoy considerable cost benefits.

The priority waste management activities are listed below.

1. Prevent or avoid the waste.
2. Reuse the waste.
3. Recycle the waste.
4. Dispose of the waste.

Refer to Figure 2.

Figure 2: Waste hierarchy







## Implementing waste minimisation

Businesses can save money by minimising waste and can keep costs down by considering waste disposal as a last resort.

A useful starting point for a minimisation program is to prepare a waste management plan (WMP). A WMP is a fundamental part of a company's approach to environmental management (see **Environmental management systems** section).

Begin preparing a WMP by undertaking a waste audit to:

- identify all waste streams
- quantify and characterise these waste streams
- establish how each waste stream is generated.

Next, conduct an assessment to identify ways to minimise each waste stream. A technical and economic feasibility analysis can help decide which option to adopt.

A WMP normally contains an implementation timetable outlining the methods selected, anticipated costs and likely environmental benefits. Periodic review will ensure the plan is being followed and help spot new opportunities.

## Dealing with specific waste streams

Segregate waste to make recycling easy. Set aside designated recycling areas for metals, plastics, paper, cardboard and other materials. This will help reduce waste and removal costs. Be careful what material is placed in general waste bins. These go to landfill.

Place general waste such as used sandpaper, broken glass, dust and broken clips in covered bins or skips so it does not blow away on windy days. Dust should also be bagged so it does not escape when transferred to the garbage truck.

Consider establishing a recycling program for aluminium cans, glass bottles, packaging materials, cardboard and office paper. Place recycling bins in easily accessible places in the office, staffroom and workshop - inside, or on the way to, the car park, next to the general waste bin or close to where people eat.

Place only dry, solid, inert wastes in industrial waste bins. Do not put liquids or hazardous materials in these bins.

Some solid wastes such as spray-booth filters, waste paints, chemical containers and rags contaminated with chemicals (such as paint) may be classified as regulated waste under the *Environmental Protection Act 1994*. These must be collected and disposed of by a licensed waste transporter. Keep records of all regulated wastes collected and disposed of.

## Resource efficiency

An efficient business is a profitable business. Efficiency requires reducing the use of resources (raw materials, water and energy) and lowering the volume and toxicity of waste and other emissions. This efficiency is often referred to as lean manufacturing, cleaner production or resource efficiency. It involves finding ways to reduce costs and environmental impacts along the entire production or service delivery process, from the supply of raw materials to operations and distribution.

Identifying and implementing resource efficiency measures is possible for managers who know their business and are prepared to have a close, systematic look at inefficiencies.

It offers opportunities to profit from:

- reducing the use of energy, water and raw materials
- avoiding waste, reusing and recycling materials
- minimising waste volumes and reducing its toxicity to lower the cost of treatment and disposal
- implementing process changes to increase production and reduce spoilage
- reducing the use of hazardous and dangerous materials to minimise dangerous goods storage and environmental liability risks
- providing a safe, clean and pleasant work environment that leads to increased productivity.

## Uncovering resource efficiency measures

Follow the below five steps to identify the best ways of making a business more efficient:

### 1. Plan and organise

A team approach to resource efficiency produces the best outcomes. With management's support, an environment team should be established that includes staff from different areas of the business. Appoint a champion or team leader and consider inviting suppliers or customers to join the team occasionally. Ideally, the environmental champion will have the full support of management and other staff. If the business is too small for an environment team, just use one or two staff members.

Identify ways to integrate resource efficiency into business planning and staff responsibilities.

### 2. Assess and measure

The environment team needs to assess processes, material flows and costs within the business and identify internal barriers to more efficient practices.

The team should start by collecting baseline data on resource use and waste – what gets measured, what gets considered. The team should also complete an initial business and process assessment, which could include brainstorming sessions, a facility walk-through or a more formal audit. It is wise to involve an outside person with technical expertise who can provide a fresh pair of eyes and ideas from other companies.

The initial assessment and data will provide a benchmark against which to measure ongoing improvement.

### 3. Identify opportunities and implement priority actions

The resource assessment will almost certainly identify immediate opportunities for cost savings. These should be implemented as quickly as possible. Small wins help maintain a team's enthusiasm. Other ideas might need further research and assessment, and take longer to implement.

The team should record ideas and options, and prepare a simple action plan outlining opportunities, issues requiring further investigation, priorities, timeframes and staff responsibility for actions. As a starting point, the team could adapt the environmental action plan template contained in this guide.

### 4. Document results and evaluate success

Record any financial investment in resource efficiency projects and the time taken to recover these costs – this is known as the payback period. Set up simple spreadsheets or other tools to document project results in terms of their financial, environmental and other outcomes. Take the time to note qualitative results such as staff enthusiasm, improved working relationships with suppliers and comments from customers. These records help to justify further resource efficiency projects.

### 5. Reward and revisit

Encourage and reward the environment team. Consider refreshing the group by alternating leaders and inviting new team members. Efficiency is a continuous process and the resource efficiency plan should be regularly revisited.

## Possible industry opportunities

Cost-effective resource efficiency opportunities can be found in several areas.

### Saving water, efficient use and recycling

- Install wastewater recycling equipment in wet areas such as car washing and detailing areas.
- Install rainwater tanks where possible and use rainwater for washing vehicles. Rainwater can also be used to supply toilets and for other non-potable requirements.

- Check taps, toilets and showers for leaks and drips and repair them promptly. Ensure all taps are turned off when not in use.
- Fit water-minimising controls where possible. For example spray nozzles on hoses, AAA-rated low-flow taps or tap aerators, water-efficient showerheads that save energy by reducing hot water use, low-flush toilets and sensors for urinal flushing.
- Keep water supply equipment well maintained and check it periodically for leaks. Make sure staff are encouraged to report leaks and repair them promptly.
- Use water meter data to identify leaks.

### Reducing hazardous materials and waste

- Avoid generating excess waste paint by mixing only enough colour coat for each job.
- Reuse any leftover paint, wherever possible.
- Install gun wash machines with solvent recycling capabilities.
- Reduce the use of hazardous materials. Conduct an inventory of all chemicals used and assess if all are needed.
- Consider replacing some chemicals with less toxic alternatives.
- Organise the chemical storage area so that older chemicals are readily accessible and used before they become out-of-date.
- Isolate recyclable liquids for collection by a licensed waste transporter.

### Working with suppliers, staff and customers

- Encourage suppliers to provide materials in bulk, collect empty containers and take packages back for reuse or recycling.
- Ask chemical suppliers for less toxic alternatives.
- Promote the benefits of being an environmentally responsible business to staff, suppliers and customers.
- Provide recycling bins that are easily accessible to staff and customers.
- Regularly communicate resource-saving successes to industry partners and associations, staff, customers and suppliers.

### Saving energy and technology upgrades

- Use sensor-activated lighting in buildings and areas where permanent lighting is not required.

### Waste storage and disposal requirements

The storage of waste chemicals should comply with the general storage requirements for hazardous chemicals as outlined in the **Storage of chemicals** section of this guide.

All waste should be stored in properly labelled, suitable containers and kept closed (except when additional waste is being added). The label should contain the date, type of waste and any other relevant information required by the disposal company.

Do not mix wastes together except for compatible flammable solvents or other clearly compatible wastes. Different classes of waste should be segregated to avoid unwanted reactions with other hazardous chemicals. This practice also facilitates cost-effective disposal.

### Disposing of waste chemicals

Surface coating workshops unavoidably produce chemical waste. Disposing chemical waste is expensive so it makes good business sense to minimise the amount produced. Businesses are responsible for disposing chemical waste in a way that does not cause environmental harm.

Adopting the following suggestions can lead to significant savings and reduced environmental risks.

1. Avoid using hazardous chemicals where possible.
2. Substitute with safe or less harmful options wherever practicable.
3. Minimise the storage and use of hazardous chemicals by ordering smaller quantities more frequently or by using them more efficiently and producing less waste.
4. Reuse and recycle chemicals where safe to do so.
5. Disposal is the last option and generally the most costly and wasteful in terms of resources.

Only engage a licensed waste transporter. Keep accurate records of all contracts and the receipts for all chemical pickups, transport and disposals. Liability for contamination may be mitigated by accurate record-keeping.

Find out if other local businesses can reuse or recycle your waste. Investigate working with other companies in the area to share waste disposal costs. Communicate with other companies in the same industry to find out how they handle waste materials.

Select a key employee to manage the hazardous waste and make sure this person receives the support they need. A surface coating workshop may still be liable if someone outside of the workshop improperly disposes of their chemicals.

- Do not pour hazardous waste on to the ground, into the sewer or into wheelie bins or bulk waste bins.
- Do not burn any waste onsite.
- Do not accept samples of chemicals that will not be used.
- Do not give away surplus chemicals unless they are going to someone who will actually use them.

**Note.** In this guide, 'hazardous waste' refers to materials classified as 'a hazardous contaminant' under the *Environmental Protection Act 1994*.

## Regulated waste

Many waste chemicals such as fuels, oils, lubricants, paint residues, lead/acid batteries and used oil filters may be classified as **regulated waste** under the *Environmental Protection Act 1994*. Specific regulatory requirements are placed on the management and disposal of regulated wastes. For a full list of regulated wastes, refer to **Schedule 7 of the *Environmental Protection Regulation 2008***.

Some regulated wastes include:

- acidic solutions and acids in solid form
- containers contaminated with a regulated waste
- halogenated organic solvents
- highly odorous organic chemicals, including mercaptans and acrylates
- hydrocarbons and water mixtures or emulsions, including oil and water mixtures or emulsions
- lead and lead compounds, including lead-acid batteries
- mineral oils
- organic solvents, other than halogenated solvents, including ethanol
- oxidising agents
- reactive chemicals
- tyres.

Specific laws apply to handling and disposing of regulated wastes. Contact the Department of Environment and Heritage Protection for further information.

## Further information

Department of Environment and Heritage Protection (DEHP)  
Hotline – phone 1300 130 372  
or visit [www.ehp.qld.gov.au](http://www.ehp.qld.gov.au)

Look in the Yellow Pages under 'Recycling' or 'Waste Reduction and Disposal' –  
[www.yellowpages.com.au](http://www.yellowpages.com.au)

Comprehensive directory of recycling services for business –  
phone 1300 763 768 or visit  
[www.businessrecycling.com.au](http://www.businessrecycling.com.au)

TechCollect – e-waste recycling –  
[www.techcollect.com.au](http://www.techcollect.com.au)

Queensland Legislation –  
[www.legislation.qld.gov.au](http://www.legislation.qld.gov.au)

# 9 Noise management

## Environmental impacts

Noise is a form of pollution and a common source of conflict between surface coating workshops and the local community. In simple terms, unwanted noise, particularly at night or the early morning, can cause annoyance and sleep disturbance.

People can become annoyed when noise affects their sleep or ability to study, relax or have a conversation. Good sleep is a prerequisite for good physical and mental functioning.

Noise control is a critical issue for surface coating workshops and needs to be managed as carefully as other environmental emissions.



## Noise criteria

Proposed surface coating workshop development needs to demonstrate that it can comply with the noise criteria contained in the Industry Code of City Plan. A noise impact assessment report, prepared in accordance with the *Noise impact assessment planning scheme policy*, can assist in demonstrating achievement of these criteria.

Noise criteria in the code are planning and design criteria, they are not the operating criteria for a surface coating workshop. The noise management requirements for a new surface coating workshop may be specified in a development permit issued by Brisbane City Council. The noise management requirements are generally based on the control measures recommended in the noise impact assessment report for the development.

A noise impact assessment report is not required where the development implements the acceptable outcomes for noise listed in the Industry Code of City Plan. Refer to the *Guideline for industrial development* for more information.

If noise is not authorised by a development permit, the environmental nuisance provisions of the *Environmental Protection Act 1994* apply.

These provisions consider whether all reasonable and practical measures have been taken by the surface coating workshop to prevent or minimise any impact by noise on people's ability to sleep, study, learn, relax or have a conversation. It also considers the impact of the noise on the amenity of the community.

Where noise requires a detailed analysis or control, an acoustic consultant should be engaged to assess the surface coating workshop's operations and recommend noise control measures.

## Noise sources at surface coating workshops

The main sources of noise from surface coating workshops are:

- vehicles (reversing beepers, air brakes and banging and clanging)
- spray-booth motors and extraction fans

- audible alarms
- amplified telephones
- public address systems
- compressors
- abrasive blasting
- sanding and grinding
- vacuum-cleaning and dust-extraction equipment
- hammering
- radios.

## Noise control measures

Noises that cause the greatest annoyance are those that occur at night or the early morning (i.e. before 7am); short, sharp impact noises (such as reversing alarms on vehicles, banging steel or impact tools); or noise that is tonal (such as some compressors, motors or pumps).

All reasonable and practical measures need to be taken to prevent or minimise environmental (noise) nuisance. Measures to consider include:

- working during daytime business hours only, not on Sundays or public holidays when background noise is lower and workshop noise is more intrusive



- working inside the workshop only
- locating windows and doors away from nearby residences when building a new workshop
- limiting deliveries to daytime business hours
- designing the flow of work to reduce the amount of reversing required by delivery vehicles
- using low-intrusion or broadband reversing beepers on trucks and other vehicles
- locating air compressors, motors and pumps inside the workshop or acoustically enclosing those located outside
- fitting air compressors with inlet and exhaust silencers
- surrounding noisy activities such as grinding, hammering or sanding with moveable acoustic screens (screens must be directly next to the noise source to be effective)
- using visual alarms instead of audible alarms such as sirens, where safe
- using alternative methods of notifying staff instead of public address systems

- selecting the lowest noise option available when buying equipment
- keeping plant and equipment well maintained
- minimising the volume of radios used by staff
- locating radios close to work areas but as far as possible from neighbours
- providing information and training to all staff outlining their responsibility to prevent or minimise noise nuisance to neighbours.

Sometimes noise abatement requires more detailed analysis and control, for example, when the usual measures such as enclosures are not sufficient, resulting in complaints. In these situations, engage an acoustic consultant to conduct a site-specific assessment. Simple, inexpensive solutions recommended by experts can often solve problems quickly.

New surface coating workshops should be separated from sensitive uses such as residential areas by an appropriate distance, particularly where there are limited solutions to reduce noise from the workshop at its source.

Establishing a good relationship with the local community through open and timely communication can help reduce the chance of conflicts over noise. If there is an exceptional circumstance that means working outside normal business hours cannot be avoided, tell neighbouring homes and businesses. Let them know what is planned and how long it will take. If it is a rare occurrence and neighbours know what is happening and that they have been considered, they are less likely to make a complaint.

Businesses that hold a development permit from Brisbane City Council must operate in accordance with the permit conditions.

Regularly walking around the workshop and the neighbouring area is one way to monitor the type and amount of noise coming from the business, especially hums or rattles from activities and machinery located outside.

# 10 Environmental management systems

## Reducing environmental risks

An environmental management system (EMS) helps businesses examine their practices and find ways to manage environmental impacts. It is not prescriptive; rather, it encourages creative, tailored solutions.

Implementing an EMS is voluntary. It is often adopted by businesses to:

- prevent and minimise pollution
- comply with environmental laws
- demonstrate due diligence
- maximise the efficient use of resources
- reduce waste
- demonstrate a good corporate image
- build awareness of environmental responsibilities among employees
- gain a better understanding of the environmental impacts of business activities
- increase profit through more efficient operations.

## About environmental management systems

An EMS provides a structured approach to planning, implementing and routinely checking an organisation's environmental protection measures. It is a tool to manage impacts on the community and the environment.

An EMS integrates environmental management into a company's daily operations, long-term planning and other management systems. It does not have to be a large document and could be part of, or be linked to, existing workplace health and safety documentation.

Depending on the circumstances of the business, it may be beneficial to certify the EMS under *International Standard AS/NZS ISO 14001:2004 Environmental management systems – Requirements with guidance for use*. Even if the EMS is not certified, this standard provides good guidance.

## Key elements of an EMS

Developing an EMS involves documenting environmental risks and their potential impacts, identifying control measures and assigning management and staff responsibility. It also includes documenting procedures, training, waste disposal, maintenance, inspections and audits.

Documenting business policies and processes to prevent and minimise pollution offers several advantages such as those listed below.

- It ensures every person involved in a business understands the roles they play in preventing and minimising pollution.
- It acts as evidence of due diligence by the management team, which may be a defence in the event of an environmental pollution incident or an environmental nuisance (if an incident occurs onsite, providing documentation that shows responsible management and active measures to avoid such incidents could provide a defence).
- It demonstrates sound environmental management to customers.
- It offers a systematic method of improving and monitoring environmental performance.



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Key elements of a successful EMS include:

- management commitment
- hazard identification and risk analysis
- monitoring and review
- community liaison.

EMS documents may include:

- environmental policy
- environmental action plan
- staff training records
- staff induction procedures
- standard operating procedures
- environmental incidents and complaints register
- waste disposal receipts
- maintenance and inspection schedules.

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## Management commitment

A key component of an EMS is an environmental policy. This could be as simple as one paragraph or a one-page statement outlining the organisation's commitment to complying with environmental laws and implementing best practice environmental management. The policy should contain clear objectives detailing what it aims to achieve.

Management should evaluate and review the policy regularly (e.g. annually) and communicate it to all staff. Resourcing environmental commitments should also be considered. Staff should be given the time and resources needed to deliver the policy.

## Environmental action plan

Review the environmental risks, hazards and impacts of business operations and create an environmental action plan. This plan should include specific objectives and targets for managing each risk or hazard and for reducing identified impacts.

This plan can be small and simple, for example, a one-page table. It can also form part of, or be linked to, existing workplace health and safety documentation.

## Hazard identification

To identify hazards that an environmental action plan should consider, assess the following:

- activities that generate or present a risk of emissions, including smoke, fumes, dust and odour
- activities that involve prescribed water contaminants and the risk of spills or leaks, including fuels, chemicals, dust and sediment
- activities that generate high noise levels
- plant, machines, equipment, tools or appliances
- chemical hazards such as storing and working with hazardous chemicals
- legal requirements.

Hazards can be identified by the following actions:

- conducting a walk-through site inspection
- listing all the tasks and work activities carried out
- looking at the ways different tasks or activities could interact and cause a hazard
- reviewing past incidents
- considering information from manufacturers or suppliers and relevant safety and storage instructions
- quantifying the amount of hazardous substances stored onsite
- talking to staff and other businesses.

All hazards need to be documented once identified.

For a hazard to pose a risk to environmental or human health, three components must be present: source, pathway and receptor.

The source is what generates the pollution (e.g. a machine). The pathway is the path or media that the pollution could travel through to access a receptor (e.g. air or stormwater system). The receptor is what could be potentially affected by the pollution (e.g. occupants of a house or waterway).

Refer to Figure 3.

**Figure 3: Example of source-pathway-receptor**



If one component is missing, the hazard is unlikely to become a risk. The hazard identification process should consider all possible sources, pathways and receptors. It is helpful to consider the hazard in relation to sensitive receptors such as stormwater drain inlets, creeks, houses, schools and neighbouring businesses and work backwards.

A risk assessment can then be used to develop strategies that break the source-pathway-receptor link.

## Risk analysis

Risk analysis involves assessing the likelihood and consequence of harmful effects due to each hazard identified. Refer to Table 3.

- Gather information about each hazard identified.
- Work out how likely it is that an incident will happen.
- Identify the consequences of an incident from each hazard. For example, if the incident could result in long-term environmental contamination, health impacts or annoyance to residents, degradation of waterways and other natural habitats, damage to property and the need to rehabilitate or decontaminate land or waterways.

- Take into account different situations or conditions that could increase the risk such as the effects of rainfall, floods or a change to a process, operating hours or storage volumes.

The following is a risk analysis matrix that can be used to assign a risk level (negligible, low, medium, high, very high or extreme) to a hazard based on its likelihood and consequence. Refer to Table 4.

**Table 3: Risk analysis matrix**

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain	Low +	Medium +	High	Very High	Extreme
Likely	Low -	Medium -	Medium +	High	Very High
Possible	Negligible	Low +	Medium -	Medium +	High
Unlikely	Negligible	Low -	Low +	Medium -	Medium +
Rare	Negligible	Negligible	Negligible	Low -	Low +

Once a risk level has been assigned to each hazard, use the following matrix to prioritise and identify the level of action required for each hazard. For example, if a hazard is assigned a medium risk, consider additional control measures to reduce it as far as practicable. Then, reassess the risk level to see if it has been reduced.

**Table 4: Risk level action matrix**

Assessed Risk Level	Environmental Impact	Action
<input type="checkbox"/> Negligible	No impact on the environment.	Undertake the activity with the existing controls in place.
<input type="checkbox"/> Low	Environmental incident comprising of environmental nuisance, caused by off-site release or harmful on-site release with minor short-term and negligible cumulative environmental impacts.	Undertake the activity with the existing controls in place.
<input type="checkbox"/> Medium	Environmental incident comprising of material environmental harm. Environmental damage is managed with site resources and procedures.	Additional controls may be needed.
<input type="checkbox"/> High	<p>Environmental incident comprising of serious environmental harm.</p> <p>Environmental damage (major, short-term or cumulative) will require outside assistance.</p>	Controls will need to be in place before the activity is undertaken.
<input type="checkbox"/> Very High / Extreme	<p>Environmental incident comprising of serious environmental harm of an extensive area where the core environmental values or attributes are threatened.</p> <p>Long-term damage, requiring long-term recovery (years).</p> <p>Environmental damage (major, short-term or cumulative) will require outside assistance.</p>	<p>Consider alternatives to doing the activity.</p> <p>Significant control measures will need to be implemented to ensure compliance.</p>

The risk assessment should not be seen as a one-off process. Risks should be reassessed at regular intervals (e.g. annually) to take into account significant changes to the site infrastructure, plant, equipment, operations and newly identified issues.

## Pollution prevention procedures

Documenting procedures to prevent pollution is one way to demonstrate sound environmental management. Procedures suitable to include in an EMS include:

- undertaking activities and tasks that present a risk of environmental pollution or nuisance
- operating pollution control equipment
- inspecting and maintaining pollution control infrastructure and equipment
- cleaning up spills and responding to pollution incidents.

Procedures should clearly outline roles and responsibilities for undertaking environmental protection tasks. For example, a procedure for cleaning out silt traps should say who is responsible for making sure the silt traps are cleaned out (e.g. site manager). This provides clarity as to who needs to do what and when.

Systems should also be in place to routinely check that staff are following the procedures.

## Training and environmental incidents register

An EMS should include a training register documenting staff induction and training (i.e. who, what and when) and an environmental incidents register.

All staff should be trained to use pollution control equipment, undertake clean up and report incidents and undertake their duties in a way that prevents or minimises pollution impacts.

The environmental incidents register records incidents that occur, rectification actions to address the incident and steps to prevent future incidents.

## Monitoring and reviewing performance

Use the systems and documentation in the EMS to regularly monitor, review and report on the environmental performance of a business. Regular environmental audits of all activities onsite can help verify performance and identify areas for improvement.

Questions to ask during a review include those listed below.

- Are the pollution control measures effective in minimising the level of risk?
- Have there been any changes to the measures?
- Are further measures required?
- Are pollution control procedures and training adequate?

It is good practice to give staff the opportunity to easily communicate environmental impact and risk issues, as well as solutions, to senior management.

## Community liaison

Surface coating workshops need systems to help maintain good community relationships and to respond to community complaints.

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All complaints should be recorded in a register, which forms part of the EMS, and includes:

- the name and address of the complainant
- the time and date of the incident
- a clear statement about the problem or complaint
- details on the outcome of the resulting investigation and solutions to the problem
- name of the person dealing with the complaint.

Being a good neighbour is good for business.

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# Appendix 1

## Definitions

### **Bund**

An impervious embankment or wall of brick, stone, concrete, or other approved material that forms the perimeter, or part of the perimeter, of a compound (e.g. a bund may be used to contain spills from acids, fuels or admixtures).

### **Environmental harm**

As defined in the *Environmental Protection Act 1994* and includes an adverse effect (whether temporary or permanent, and of whatever magnitude, duration or frequency) on an environmental value and includes environmental nuisance.

### **Environmental nuisance**

As defined in the *Environmental Protection Act 1994* and includes any unreasonable interference or likely interference with an environmental value that is caused by noise, dust, odour, light, an unhealthy, offensive or unsightly condition because of contamination, or another way prescribed by regulation.

### **Environmental value**

As defined in the *Environmental Protection Act 1994* and includes a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or another quality of the environment identified and declared to be of environmental value under an environmental protection policy or regulation.

### **General environmental duty**

As defined in the *Environmental Protection Act 1994*, i.e. a person must not carry out an activity that causes, or is likely to cause, environmental harm, unless the person takes all reasonable and practicable measures to prevent or minimise the harm.

### **Petroleum/petroleum product**

Any fuel that consists predominantly of a mixture of hydrocarbons derived from crude oil, whether or not the fuel includes additives such as ethanol. Examples include petrol, diesel, engine oil, lubricating oil and aviation fuel.

### **Regulated liquid wastes**

Wastes that have been identified as unsafe for sewer disposal due to their chemical, biological or physical nature (e.g. flammable). These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998*. Regulated liquid wastes include:

- acids and acid solutions
- dyes
- organic solvents
- electroplating effluent
- caustic solutions
- pesticides
- vehicle wash down waters
- grease trap wastes
- hydrocarbon and water mixtures or emulsions, including oil and water mixtures or emulsions
- isocyanate compounds
- oils.

## Regulated solid wastes

Wastes that have been identified as unsafe for landfill disposal. These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 2008*.

Regulated solid wastes include:

- arsenic
- asbestos
- lead-acid batteries
- biocides
- grease interceptor trap effluent and residues
- paint sludge
- resins.

## Regulatory authority

Brisbane City Council and/or the Queensland Department of Environment and Heritage Protection.

## Safety data sheets (SDS)

Information sheets on products that manufacturers are required to provide. They outline the composition, applications and precautions that need to be taken in using such products.

## Stormwater

Rainfall that runs off hard surfaces such as roofs, roads and car parks, or off ground that has become saturated. Stormwater flows untreated to local creeks and eventually, in Brisbane, to the Brisbane River and Moreton Bay.

## Trade waste

Liquid wastes from any business, industry, trade or manufacturing process approved for sewer disposal, other than domestic sewage.

## Transitional Environmental Program (TEP)

A specific program that, when approved, achieves compliance with the *Environmental Protection Act 1994* for the matters dealt with by the program by:

- reducing environmental harm
- detailing the transition to an environmental standard.

## VOCs (volatile organic compounds)

Evaporated organic solvents (e.g. hydrocarbons, alcohols or unburnt liquid fuels) that are known (or suspected) to have environmental or health effects. Examples of chemicals that include VOCs include solvents, thinners, acrylic lacquers and fuels.

# Appendix 2

## Guidelines for a Transitional Environmental Program (TEP)

### Introduction

The *Environmental Protection Act 1994 (the Act)* was developed to protect Queensland's environment while allowing for sustainable development.

As *the Act* encourages continual improvement of industrial activities, there might be instances where some activities may not be able to comply immediately with its requirements. There are allowances for businesses in this position to develop a Transitional Environmental Program (TEP). A TEP is an action plan that is negotiated between the operator of an activity and the administering authority, for example, the Department of Environment and Heritage Protection (DEHP) or Brisbane City Council. This action plan outlines how the operator of the activity intends to achieve compliance with the provisions of *the Act* and the timeframe in which compliance is to be achieved.

The TEP offers the operator of the activity some degree of short-term protection against fines or prosecution for non-compliance with *the Act*. Heavy penalties apply for non-compliance with the TEP.

The guidelines below have been developed to assist operators in the preparation of a draft TEP in accordance with *the Act*. The draft TEP must be submitted to the administering authority for review and approval.

While these guidelines provide a step-by-step process for developing a draft TEP, each activity is different and operators of activities are expected to develop site-specific management actions.

### Components of a TEP

The main elements that must be included in a TEP include:

- a statement on which activities or approval conditions (if applicable) are to be addressed under the TEP
- a statement of the objectives to be achieved and maintained under the TEP
- a statement on how the objectives are to be achieved and the proposed timetable for achieving the objectives
- a schedule of milestones and performance indicators at intervals of no longer than six months
- a schedule of monitoring and reporting compliance with the TEP.

### Submission of a TEP

Any operator can voluntarily submit a draft TEP at any time, provided the appropriate fee is paid at the time of the submission. Voluntary submission of a TEP can occur when an operator has identified a work process that does not comply with *the Act* or approval conditions (if applicable), or is concerned that the activity may not comply with an Environmental Protection Regulation.

Brisbane City Council can require the submission of a TEP where an inspection has identified a non-compliance issue. The timeframe for submission of a draft TEP may depend on the severity of the non-compliance or the risk of environmental harm from the non-compliance.

All draft TEPs must be submitted in a form approved by Brisbane City Council or DEHP, together with the appropriate fee. Please check boxes below.

<input type="checkbox"/>	Identify activities that do not comply with <i>the Act</i> .
<input type="checkbox"/>	Develop a statement of environmental objectives to be achieved and maintained under the TEP.
<input type="checkbox"/>	Detail how the environmental objectives will be achieved and a timetable for achievement of each of the objectives.
<input type="checkbox"/>	Detail appropriate milestones and performance indicators at intervals of no more than six months.
<input type="checkbox"/>	Detail appropriate monitoring and reporting of compliance with the TEP.



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Australian Standard AS1940: The storage and handling of flammable and combustible liquids.

Australian Standard AS3754: Safe application of powder coatings by electrostatic spraying.

Australian Standard AS3780: The storage and handling of corrosive substances.

Australian Standard AS3833: The storage and handling of mixed classes of dangerous goods, in packages and intermediate bulk containers.

Australian Standard AS4114.1: Spray painting booths, designated spray painting areas and paint mixing rooms – Design, construction and testing.

Australian Standard AS4114.2: Spray painting booths, designated spray painting areas and paint mixing rooms – Installation and maintenance.

Australian Standard AS4326: The storage and handling of oxidising agents.

Australian Standard AS4361: Guide to lead paint management.

Australian Standard AS4452: The storage and handling of toxic substances.

ISO 14001, Environmental Management Systems – Specification with Guidance for Use.

US Environmental Protection Agency, National Emission Standards for Hazardous Air Pollutants – Paint stripping and Miscellaneous Surface Coating Operations at Area Sources, 9 January 2008.

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Queensland Department of Justice and Attorney-General, Abrasive Blasting Code of Practice 2013 (based on a national model code of practice developed by Safe Work Australia).

Queensland Department of Justice and Attorney-General, Spray Painting and Powder Coating Code of Practice 2013 (based on a national model code of practice developed by Safe Work Australia).

## Commonwealth legislation

National Environmental Protection (National Pollution Inventory) Measure 1998

## Queensland State legislation

Environmental Protection Act 1994

Environmental Protection Regulation 2008

Environmental Protection (Noise) Policy 2008

Environmental Protection (Air) Policy 2008

Environmental Protection (Water) Policy 2009

Environmental Protection (Waste Management) Policy 2000

Environmental Protection (Waste Management) Regulation 2000

Transport Operation (Marine Pollution) Act 1995

Sustainable Planning Act 2009

Work Health and Safety Act 2011

## Brisbane City Council legislation

Brisbane City Plan 2014

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**Brisbane City Council**  
**Information**  
GPO Box 1434  
Brisbane Qld 4001

Printed on recycled paper



CA-15-743911-01-1174  
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