

# Pollution Solutions

## FIBREGLASS PRODUCT & PLASTIC FOAM MANUFACTURERS

JULY 2000



Operator's Environmental Guide for Environmentally Relevant Activities 51

- Blown Plastic Foam Manufacturing
- Fibre Reinforced Plastic Manufacturing

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# EXPLANATORY NOTES FOR OPERATOR'S ENVIRONMENTAL GUIDE (OEG)

## Purpose of the OEG

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The *Environmental Protection Act 1994* states '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 (the "general environmental duty")'. This clause applies to all persons in Queensland.

Under the *Environmental Protection Act 1994* and *Integrated Planning Act 1997* the Local Government licenses and approves businesses that have the potential to cause environmental harm – Environmentally Relevant Activities (ERA). Plastic manufacturing is a level 1 ERA listed in the *Environmental Protection Regulation 1998*.

All ERAs must have a development permit and/or an environmental authority (licence) which lists the conditions of operation to prevent pollution. However, setting these conditions is only part of the story. Businesses should know how to meet these conditions (compliance) and to go beyond (best practice).

This Operator's Environmental Guide (OEG) – *Pollution Solutions for Fibreglass Product And Plastic Foam Manufacturers* has been developed to assist licensees to achieve their general environmental duty as above. That is, to achieve compliance with the *Environmental Protection Act 1994* and progress towards best practice environmental management.

The OEG was developed jointly by Brisbane City Council and representatives of the plastic manufacturing industry.

## Limitations of the OEG

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Council has written this OEG as a guide only. It does not form part of the licence conditions. Complying with this document does not necessarily exempt the licensee from prosecution or ensure compliance with the *Environmental Protection Act 1994, Regulation and Policies (Air, Water, Noise and Interim Waste)*.

Licences may contain conditions that vary from the requirements of the OEG. These are often included because of site specific requirements or because of the nature of the activity. Whether your operational performance meets the conditions of your development permit and/or environmental authority (licence) will be the main determinant of compliance.

The control measures in the OEG are recommendations only. **It remains the responsibility of each operator and employee of the business to satisfy the general environmental duty** applicable to that business. The operator should carefully consider the information in this OEG and put in place measures that help to achieve this objective.

This OEG represents accepted industry practice at the time of issue and is therefore subject to change. Please note the date recorded on the front.



## How to use the OEG

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This OEG is based on three central concepts. These are explained below and each operational process is defined according to these concepts.

### Environmental Outcomes

are outcomes, or goals, that Council considers important to achieve if the environment is to be protected.

**The Environmental Outcomes are highlighted in bold text.** You should try to satisfy the general environmental duty. The environmental outcomes in the OEG, however, do not ensure that this duty is achieved and should be considered in conjunction with your development permit and/or licence conditions.

### Compliance

means the control measures that Council recommends as the minimum required to meet the environmental outcome for the plastic manufacture industry.

In some cases, a number of compliance control measures may be listed for one process. In these cases, you are advised to aim for the control measure or combination of control measures that is most likely to achieve the environmental outcome for that process.

Alternatively, you may be able to meet an environmental outcome in a way that is not listed in this OEG. It is recommended that in these instances the alternatives be discussed with a Council Officer prior to implementation.

Although this guide lists some solutions, Council encourages operators to develop alternative ideas or innovations that are consistent with the environmental outcomes and other relevant requirements.

### Best practice

means the control measures that are considered to be above the minimum requirements. They are not compulsory. Best practice incorporates concepts such as cleaner production, waste minimisation, recycling and reuse. Use of best practice control measures may help to improve industry standards and progress towards best practice in the industry. Best practice measures are marked with a  in the text.

In some cases, a business may be required to use a best practice control measure, rather than compliance, if an authorised officer believes that it is necessary to achieve an environmental outcome.

The best practice options listed are not fully inclusive; they only indicate what options may be available. Other best practice options not listed in this OEG may be used.

Importantly, this OEG takes into account changing industry standards, technology improvements, and scientific knowledge and community expectations.



# ENVIRONMENTAL DUTY

## Develop environmental commitment and sound environmental performance

- Develop a commitment to being good neighbours to prevent or minimise pollution.
- Ensure that you complete your annual return, and forward it to Council with the specified fee on the anniversary of your licence.
- Ensure all staff are aware of the development permit and/or licence conditions and the relevant methods and procedures contained in this OEG.



Develop an environmental management system (EMS) specifically for your business.



Involve staff in developing environmental management procedures.



Ensure all staff are trained in the environmental management of the business.



# ENVIRONMENTAL MANAGEMENT

## Implement environmental policies and practices

- The object of the Environmental Protection Act 1994 is to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

## Environmental Management Program (EMP)

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### Achieve compliance for non-conforming activities

- Operators who are currently unable to comply with the requirements of licence conditions and the OEG may be required to submit an EMP for approval.
- An EMP is a binding agreement between your business and Council that sets out the areas where your business needs to improve to achieve compliance, and the time frame to achieve them. This allows you to operate your business although you may not fully comply, as long as Council has a firm arrangement with you to rectify problem areas in a mutually agreed time.

## Environmental Management System (EMS)

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### Maintain compliance with licence conditions and implement best practices



Develop an EMS to ensure environmental performance and compliance with licence conditions and the OEG. An EMS provides a systematic method for meeting environmental outcomes, licence conditions and the ways or procedures for meeting and exceeding compliance. It allows for:

- better practices
- monitoring of, and reporting on, performance
- training of staff
- keeping of relevant records
- complaint response
- emergency and incident response.



## Plan to protect your environment and reduce your business risks



An EMS addresses noise, air quality, waste and any other relevant environmental issues associated with processes that could reasonably pose a significant risk to the environment, if not appropriately controlled, monitored and/or managed.

- For low risk activities, the EMS should be kept concise with control measures, checklists and records (e.g. development permit, waste disposal) maintained.
- In higher risk activities, licence conditions and procedures generally require more detail in an EMS. In some cases, preparation by an environmental consultant is recommended.
- The basic objectives are to increase business performance and reduce environmental risks through good management practices. Key components in the EMS include:
  - monitoring and reporting
  - records
  - training of employees
  - complaint response
  - emergency and incident responses.



# PLASTIC FOAM MANUFACTURE PROCESSES AND MANAGEMENT

## Foam Blowing

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Foam blowing processes are a source of hazardous volatile emissions to the environment and include the use of diisocyanates (hazardous chemical solvent) and chlorinated solvents (hazardous and ozone depleting solvents).

Emissions from heating of resins include volatiles, acetic acid and potentially toxic compounds such as carbon monoxide and acrolein.

### Protect air quality and minimise emissions of volatile solvents including isocyanates

- Exhaust gases must be extracted and filtered prior to discharge to the environment to prevent emissions of hazardous compounds. Filtration equipment includes activated carbon filters or water scrubbers.

### Protect the ozone layer by using non-chlorine blowing agents

- Chlorofluorocarbon compounds must not be used as auxiliary blowing agents (ABAs).
-  You should consider alternative and less polluting ABAs or introduce technology aimed at reusing ABAs. Consider non-chlorine blowing agents that are not atmospheric ozone depleting.
-  Substitute acetone for hazardous ABAs such as methylene chloride (contains chlorine).

### Protect community health and reduce isocyanate emissions

-  Flexible polyurethane plants should implement production technologies that reduce the use of toluene diisocyanate (TDI). Rigid polyurethane plants should implement production technologies that reduce the use of methyl diisocyanate (MDI).

### Maintain equipment to minimise impacts, maximise efficiency and reduce repair costs

- Filtering devices, other pollution control equipment and foam blowing equipment must be regularly maintained as per manufacturers' advice and specifications or as required to maintain effective operation.



## Foam Moulding

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### Protect air quality and minimise emissions of volatile solvents and hazardous chemicals



Use high pressure mix heads or self-cleaning mix heads. These will reduce or eliminate volatile emissions from mix head flushing and cleaning.



Use the following substitutes:

- non-volatile and non-hazardous agents such as polyol or agents based on d-limonene, cyclic amide or ethyl ester instead of hazardous flushing and cleaning solvents (such as methylene chloride)
- water based mould release agents wherever possible
- naptha-based (or other less hazardous) release agents instead of hazardous mould release agents such as trichloroethane and methylene chloride.



Use electrostatic guns to apply mould release agents and reduce overspray. Alternatives include airless, air-assisted airless or high volume low pressure (HVLP) spraying equipment.

## Equipment Cleaning

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### Protect soil and water quality and ensure proper disposal of contaminated solvents

- Always store contaminated and spent solvents used for cleaning equipment in sealed drums or containers.
- Contaminated solvents are a regulated waste and must be disposed by:
  - a licensed waste removalist
  -  treatment of solvent on-site for recycling
  -  recycling via a reputable solvent recycler.

### Protect air quality and minimise emissions of volatile solvents

- Use steam cleaning methods for cleaning and flushing hoses, mix heads and other foam pouring equipment. Steam may be sourced from other plant operations. Any condensate must be collected and treated as for wastewater.



Cleaning solvents should be substituted to reduce volatile emissions and chemical hazards. Methylene chloride and other hazardous solvents should be substituted with d-limonene, cyclic amide, ethyl ester and glutarate ester based solvents.



### **Protect water quality and ensure proper disposal of sewerable material**

- Wastewater from washdown and equipment cleansing (e.g. steam cleaning or water-based) and other activities must be directed to the sewerage system under the conditions of a Trade Waste Permit, or collected for recycling or disposal by a licensed waste removalist.
- Never discharge wastewater from equipment cleaning to the stormwater system, land or water.

## **Fabrication**

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### **Protect air quality and reduce dust and particulate emissions**

- Operations that produce large volumes of dust and particulate emissions (e.g. foam block cutting) must be mechanically ventilated and discharged through appropriate filtration equipment.

### **Protect air quality and reduce emissions of volatile solvents**

- Always carry out the application of solvent based glues using spray equipment in an approved ventilated booth (refer to Appendix 1).



Use water-based adhesives wherever possible.

### **Protect water and soil quality and ensure proper disposal of wastewater**

- Never carry out fabrication in areas where the wastes (i.e. fine dust and foam material) may contaminate soil or stormwater (e.g. outside).
- Collect waste glues, thinner and solvents and store in sealed containers for recycling or disposal via a licensed waste removalist.



# FIBREGLASS MANUFACTURING PROCESSES AND MANAGEMENT

## Spray Lay-up

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The fibre reinforced plastics (FRP) industry is a source of hazardous volatile emissions to the environment. Acetone (a solvent used to clean tools and other surfaces contaminated with resin) and styrene (the volatile component of the polyester resin) are the largest contributors from a FRP facility.

Styrene emissions from open-mould processes tend to be high because of the spray-up technique used to apply the resin and the large surface areas of the part that is exposed during curing.

### Protect air quality and minimise volatile solvent and particulate emissions

- Staff must be trained in spraying techniques that minimise overspray and losses of volatile solvents and particles. These techniques include aiming the spray lay-up gun perpendicular to the open mould to increase the FRP transfer efficiency
- Spray lay-up must be carried out in an approved booth (refer to Appendix 1). Where this is impractical, emissions must be contained and controlled by other means as appropriate.



Use airless, air-assisted airless, or high volume low pressure spraying equipment. Internal mix, airless chopper guns result in lower styrene emissions than other types of chopper guns.



The smallest practical area of spray lay-up over the mould should be undertaken at any one time. Use hand lay-up methods in preference to chopper gun application where practical. Hand lay-up releases less styrene than chopper gun application.

### Maintain pollution control equipment to minimise impacts, maximise efficiency and reduce repair costs

- Filtering devices, other pollution control equipment and spray lay-up equipment must be regularly maintained as per manufacturers' advice and specifications or as required to maintain effective operation.
- The spray lay-up equipment must be properly maintained and periodically cleaned. This will avoid glass jamming in the spray gun chopper mechanism and the creation of additional waste (resin and glass) when fixed.

### Prevent landfill contamination

- Overspray waste (including overspray resin, glass and any cardboard coverings) must be disposed of appropriately. Under-cured resin must be hardened with a catalyst prior to disposal in an industrial bin (solid inert waste only).

### Ensure proper disposal of waste material

- Collect accumulated sludge from any wet scrubber systems for recycling, or dispose using a licensed waste removalist.



## Lay-up and Curing

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### Protect air quality and minimise volatile solvent emissions

- The area of resin exposed to the atmosphere at any time must be minimised by using appropriately designed containers for holding resins (refer to Appendix 1).
- Always do laying-up of moulds or work in a booth, shed or building. Keep the doors closed during any lay-up and mechanically ventilate.
- Low level vents (for heavier than air emissions) and high level vents (for lighter than air emissions) must be installed in all buildings except in areas being used by booths. This allows odours to escape at high levels rather than drifting out through windows and doors possibly causing environmental nuisance to neighbours.
- Replace lids promptly on containers of solvent, resin, initiator and accelerator. This reduces evaporation and material loss and prevents contamination by dust.

### Protect air quality and health by using styrene substitutes at little extra cost



Use Low Styrene Emission (LSE) resins in all applications unless the particular product requires special physical or chemical properties that cannot be achieved by using these resins. LSE resins release 30–80% less styrene than normal resins, require minimal changes to spray equipment and are available at little or no extra cost.

## Spray Equipment Cleaning

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### Minimise volatile emissions

- Use a gun wash station or similar for the cleaning of spraying equipment.

### Protect water quality and ensure proper disposal of contaminated solvents

- Store all contaminated and spent solvents used for cleaning equipment in sealed drums or containers.
- Contaminated solvents must be disposed by either:
  - a licensed waste removalist
  -  treatment of solvent on site for recycling
  -  recycling via a reputable solvent recycler.



Cleaning solvents should be substituted to reduce volatile emissions. In a typical FRP operation, more than 50% of the purchased solvent can be lost to the air through evaporation. Substitutes include higher boiling solvents or aqueous solvents.



- Higher boiling solvents work in the same way (e.g. acetone) but do not evaporate as readily. However, higher boiling solvents may leave a liquid film and the part may require active drying (as opposed to air drying). DBE (dibasic ester) is an example of a higher-boiling solvent.
- Aqueous cleansers rely on mechanical action (such as brushing) to remove resin from contaminated surfaces. Employees should be specially trained in new cleaning techniques when aqueous cleansers and emulsions are introduced.

### **Protect water quality and ensure proper disposal of sewerable material**

- Wastewater from washdown and equipment cleansing (aqueous) and other activities must either be directed to the sewerage system under the conditions of a Trade Waste Permit, or collected for recycling or disposal by a licensed waste removalist.
- Never discharge wastewater from the cleaning of spray equipment to the stormwater system, land or water.

### **Prevent contamination of landfill**

- Disposal of under-cured resin material from cleaning tanks must be hardened by adding an appropriate amount of catalyst prior to disposal in an industrial bin (i.e. solid inert waste).

## **Trimming, Grinding, Sanding and Drilling**

### **Protect air quality and reduce dust and particulate emissions**

- Operations that produce large volumes of dust and particulate emissions must be mechanically ventilated and discharged through appropriate filtration equipment.



The amount of grinding and sanding should be reduced. This may be achieved by trimming as much as possible with a knife or mechanical cutter when articles are still 'green', that is solidified but not yet hard.



Redesign moulds to reduce the quantity of cut-out and grinding waste generated.



Hand held equipment should be installed with individual dust collection devices.

### **Protect water and land quality and ensure proper disposal of wastes**

- Never do surface finishing (sanding and washdown) in areas where the waste (e.g. fine dust particles) may contaminate soil and stormwater or flow to stormwater (e.g. outside).
- Cured FRP wastes (trim waste, cut-out and grinding waste) must be disposed of via an industrial bin (solid inert waste only) for transfer to landfill. All dusts (grinding waste) should be securely wrapped prior to disposal.



# STORAGE OF POTENTIAL CONTAMINANTS



## Minimise accidental spills and prevent contamination of soil, stormwater, ground-water and/or air

- Store chemicals and other materials that may contaminate soil, stormwater, groundwater and/or air in a manner that prevents or minimises the impact of any accidental spills or releases. This means:
  - potential liquid contaminants stored in a secure, covered area away from through traffic. Such contaminants may include disinfectants, fuels, oils, detergents, poisons, cleaning solvents, alkaline or acidic solutions;
  - storage areas provided in an impervious bunded area or compound to contain any leakage or spillage. The capacity of the compound shall be at least the capacity of the largest tank or package in the compound (Bunding may not be required where the storage is inside a workshop or similar area and the operator can demonstrate that any spills will not escape the area and contaminate stormwater or surrounding ground.); and
  - where dangerous goods (as defined by the ADG Code) are stored in quantities in excess of minor storage (refer to Note below), the capacity of the compound shall comply with the requirements of the relevant legislation, Australian Standard and/or Code of Practice. Relevant Australian Standards may include:
    - AS 1940 *The storage and handling of flammable and combustible liquids*
    - AS 2022 *Anhydrous ammonia - Storage and handling anhydrous ammonia*
    - AS 2714 *The storage and handling of hazardous chemicals - Class 5.2 substances (organic peroxides)*
    - AS 3780 *The storage and handling of corrosive substances*
    - AS 3833 *The storage and handling of mixed classes of dangerous goods in packages and intermediate bulk containers*
    - AS 4081 *The storage, handling and transport of liquid and liquefied polyfunctional isocyanates*
    - AS 4326 *The storage and handling of oxidising agents*
    - AS 4452 *The storage and handling of toxic substances*

*Note: Storage of materials in excess of minor storage quantities may require approval, licensing and full compliance with the above standards. Contact the Council or the relevant dangerous goods administering authority for further information.*

- Storage must be:
  - away from any heating or ignition sources
  - provided with adequate natural or mechanical ventilation relevant to the nature of the substance and its use.



### Reduce volatile emissions

- Store volatile liquids (e.g. solvents, thinners) in closed containers that are kept closed when not in use. This will avoid unnecessary exposure of volatile liquids.
- Keep Material Safety Data Sheets (MSDS) for all hazardous substances used or stored on the site. In case of emergency an MSDS is the most effective means of assessing risk.

*CAUTION!:* Some classes of materials may react dangerously if mixed or stored together. Incompatible materials must be segregated to minimise the possibility of any reaction. Read and follow all directions on labels. Refer to the material's Material Safety Data Sheet (MSDS) or contact the manufacturer for further information.

### Respond promptly to spills and leaks

- Keep clean-up equipment, absorbent materials, and any materials for neutralising or decontaminating spills on the premises. Staff are to be adequately trained in the use of these materials.
- Immediately take action to clean-up spills or leaks. Contaminated materials are not to be reused and must be appropriately contained and packaged for transport for either recycling or disposal by a licensed waste operator.

### Minimise chemical risks



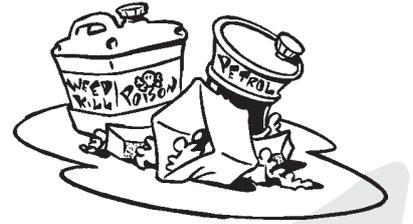
- Fit containers of chemicals (e.g. solvents) with taps to enable pumping instead of pouring.
- Position trays under chemical container taps to catch any spillage or drips. Ensure the tray's material is compatible with the chemical.



# WASTE MANAGEMENT

## Reduce waste of material resources and landfill space

- Minimise all wastes produced by site activities.



## Recycle and reduce waste disposal costs



Disposal of wastes should be viewed as the **last** option in environmental management strategies. The life of material resources may be extended by recovery, reuse and recycling.



Implement a waste recycling (reuse) system for non-hazardous solid wastes using separate containers for individual waste streams (refer to Solid Wastes section).

- Clearly label waste containers and locate them in convenient areas to encourage use. Mixing wastes may make them unsuitable for reuse or recycling.

## Protect soil, stormwater and groundwater quality

- Store solid wastes undercover so contaminants cannot be washed to stormwater by rain.
- Never dispose of waste on site.



Use wet/dry vacuum cleaners with dust filters for general cleaning of floors instead of sweeping and hosing with water.

## Prevent landfill hazards

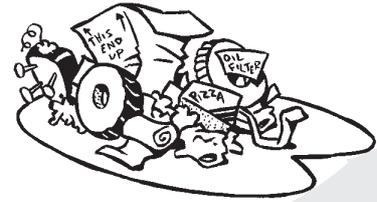
- Material put into industrial bins will generally go to landfill. Do not dispose of gas cylinders, asbestos-containing materials or synthetic-mineral fibres into an industrial bin; instead wastes should be disposed through a licensed waste removalist.
- Only put solid inert waste in industrial bins.

## Protect air quality

- Incinerating waste on site is prohibited.



# SOLID WASTES



## Hazardous Wastes (regulated)

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### Prevent contamination of landfill, soil and water

- Regulated wastes are those that have been identified as unsafe for municipal or refuse landfill disposal. These wastes are listed in Schedule 7 of the *Environmental Protection Regulation 1998* (refer to Appendix 3) and must be disposed through a licensed waste removalist.
- Keep proof of proper disposal of hazardous wastes for presentation to Council officers. Proof of appropriate disposal includes:
  - hazardous waste disposal facility dockets
  - waste manifest documents
  - licensed waste transport receipts.

## Non-hazardous Wastes

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### Conserve material resources, landfill space and reduce waste disposal costs



The following solid wastes are recyclable. They should be collected in separate containers for disposal at a waste recycling and reprocessing facility:

- clean cardboard and paper
- aluminium cans, drink bottles
- plastics
- steel drums, drained steel cans
- metal parts
- rags (can be laundered and reused).

### Ensure appropriate disposal of non-recyclable solid wastes

- Always dispose of non-recyclable solid waste at a licensed general waste disposal facility e.g. local government service or approved waste removalist.

### Prevent contamination of landfill and groundwater with hazardous wastes

- Empty all containers or vessels containing oils, solvents, and other chemicals or potential contaminants before disposing via the industrial bins.

### Prevent air contamination by harmful dusts

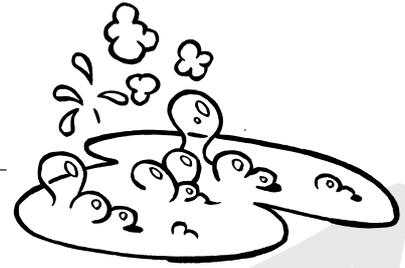
- Bag floor sweepings and other dusty wastes before disposing via the industrial bins.
- Only transport general solid waste in your own vehicle or by a licensed waste transporter.



# LIQUID WASTES

## Non-sewerable Wastes (regulated)

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### Prevent contamination of landfill, soil and water

- Non-sewerable (regulated) wastes are those that have been identified as unsafe for sewer disposal. These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998* (refer to Appendix 3) and must be disposed of by a licensed waste removalist.
- Keep proof of proper disposal of non-sewerable wastes for presentation to Council officers upon request. Proof of appropriate disposal includes:
  - hazardous waste disposal facility docket
  - waste manifest docket
  - licensed waste transport receipts.



Separate out recyclable liquid wastes for collection by a licensed waste removalist. Recyclable liquid wastes include solvents, thinners, and waste oils.

## Sewerable Wastes

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### Ensure compliance with approval conditions (Trade Waste Permit)

- Obtain a Trade Waste Permit from Council prior to discharge of any trade waste to the sewer. The permit establishes the discharge conditions for the waste.
- Washdown waters must either be directed to the sewerage system under the conditions of the Trade Waste Permit, or collected for recycling or disposal by a licensed waste removalist. This includes condensate from steam cleaning.
- Water-miscible solutions are generally accepted under a Trade Waste Permit. This may include dilute organic wastes.

### Prevent contamination of landfill, soil and water



On-site treatment and reuse of wastewater can be used to replace or reduce disposal of wastewater to sewer. The systems of treatment and nature of reuse must not cause pollution or be hazardous to persons (refer to Appendix 4).



# STORMWATER MANAGEMENT

## Prevent contamination of soil, stormwater and local watercourses

Stormwater flows untreated to your local creek or waterbody.

- Prevent stormwater from entering or leaving work areas where it may become contaminated with oils, chemicals, particulates or solvents.
  - Cover and bund such areas where necessary to avoid the incursion of stormwater and prevent hazardous and trade wastes from contaminating the surrounding soil and stormwater system.
- Prevent wastewater containing contaminants (such as detergents, solvents, emulsions, degreasers and oils) from contaminating stormwater or the ground. Do not hose workshop floor, vehicles or machinery parts on to the surrounding soil or into the stormwater drains.
- Store wastes undercover so that contaminants cannot be washed to stormwater by rain.



## Avoid sewerage system overload

- Do not direct stormwater to the sewerage system. It is an offence under the *Sewerage and Water Supply Act 1949*.
- Contain any contaminated stormwater (e.g. holding tank) and:
  - dispose by a licensed waste removalist
  - treat on-site to an appropriate standard for discharge
  - treat on-site for recycling or reuse (refer to Appendix 4).

**CAUTION!:** Contaminating stormwater and other Queensland waters may result in an 'on the spot' fine or prosecution under the *Environmental Protection Act 1994*.

*The Environmental Protection (Water) Policy 1997 prohibits the discharge of 'certain things' into a roadside gutter, stormwater or a water, or to a place where it could be reasonably expected to move or to be washed into a roadside gutter, stormwater or a water. Discharges to stormwater must comply with the Environmental Protection (Water) Policy 1997.*



# AIRBORNE WASTES



## Stack Emissions

### Maintain and protect local and regional air quality, soil and waters

- Emissions from this activity (e.g. dusts, solvents or odours) must comply with those outlined in the *Environmental Protection (Air) Policy 1997* or those prescribed by Council.
- Emissions from foam blowing activities must be extracted and filtered using activated carbon or a water scrubber to prevent emissions of volatile organic compounds (including isocyanates) to the environment.
- Exhaust gases must be discharged vertically through a stack with a minimum height of 8 meters above ground level or 4 meters higher than the highest ridgeline of the building, whichever is the higher.
- Fit emissions stack with an effective rain protection device that does not impede the discharge of exhaust gases from the stack.



Use air-dispersion modelling to determine:

- buffer distances between the activity and sensitive land
- optimum stack height and exit velocity.

### Maintain air pollution control equipment



Examine and review the need for enhanced emission controls annually and if you receive complaints about performance.

- Regularly maintain any emission control equipment such as cyclones, baghouse filters or afterburners as per manufacturers' instructions.
- Immediately replace or repair any emission control equipment that is blocked, frayed, leaking or not functioning within specifications. Spare bags and filters must be kept on-site.

### Ensure emissions are below prescribed Air Quality Limits

- Undertake regular monitoring, recording and reporting of air emissions to ensure compliance with the stack emission standards and ambient standards set in the *Environmental Protection (Air) Policy 1997*.
- Install monitoring ports in all stacks and other air emissions discharge points. Refer AS 4323.1 (1995) - *Stationary Source Emissions: Method 1: Selection of Sampling Positions*.
- Keep a register of all recorded emissions and air quality indicator levels measured and have available for Council inspection.



## Dust Control

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### Maintain and protect local and regional air quality, soil and waters

- Control dust generation so that particles do not move off-site. Dusts may also contain hazardous materials and contaminate air, soil and waters.
  - Immediately clean up material spilt on traffic areas before vehicle movement can move it.
  - Regularly collect and place in a sealed bag any floor sweepings, dust, powder waste or absorbent clean up materials, before disposing in a covered waste bin.
-  Use wet/dry vacuum cleaners with dust filters for general cleaning of the workshop floor surface instead of sweeping and hosing with water.

## Odour/Volatile Emissions

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### Reduce odour and volatile emissions to prevent environmental nuisance

- Maintain adequate ventilation and hygiene to reduce the generation of odour.
  - Control any exhaust emissions from vehicles to prevent nuisance or objectionable odours/fumes off-site.
-  Maintain good housekeeping and cleaning practices.
-  Use mechanical ventilation systems and activated carbon filters or scrubbers to prevent the release of any uncontrolled and objectionable odours from buildings or rooms.



# NOISE MANAGEMENT



## Prevent nuisance and unreasonable noise

- The activity must not cause an 'unreasonable noise' as defined in the *Environmental Protection (Noise) Policy 1997*.
- Use the layout of the buildings and the natural topography as noise barriers where possible. Cost-effective landscaping improvements (e.g. fencing, mounds, and plants) can be used to reduce noise emissions and therefore noise complaints.
- It is best to avoid using extension telephone bells and public address systems. If they are considered necessary then keep them at the lowest possible audible level. Also ensure that music does not cause an annoyance to the neighbours.
- Ensure that silencers fitted to air compressors, pumps, fans and blowers and other noisy machinery are effective.
- Enclose or acoustically screen noisy equipment not complying with *Environmental Protection (Noise) Policy 1997* to muffle noise. Such equipment or operations should be located away from noise sensitive land uses.
- Reduce structural-borne noise and vibration by mounting equipment on vibration isolating platforms, rubber mats, or by increasing the mass weight of equipment.
- Fit mechanical ventilation systems (e.g. air conditioners, fans) with noise-proof ducting and acoustically designed intake and exhaust openings.
- Ask for noise reduction devices when purchasing new plant and equipment.
- Close windows and roller doors facing noise-sensitive premises and seal all unnecessary openings.
- Only operate heavy vehicles in daylight hours.
- Regularly maintain all equipment and vehicles and attend promptly to any loose parts, rattling covers, worn bearings and broken components. This should be addressed through a regular maintenance schedule and correct staff training.

*Note: Premises causing ongoing noise problems may be required to introduce other noise control measures, including noise monitoring and reporting.*

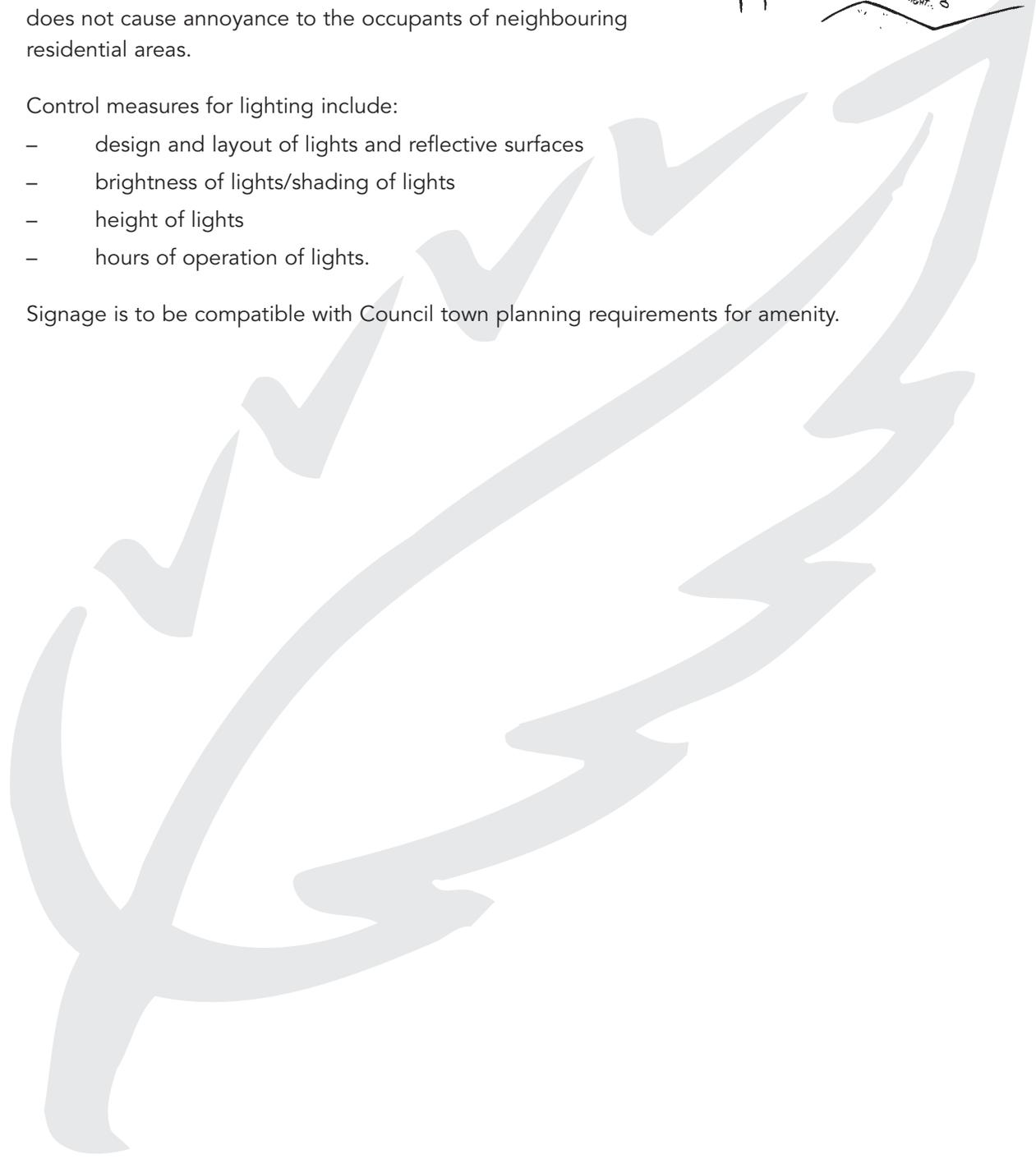
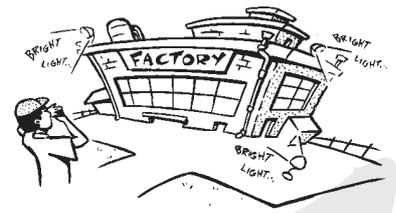
*Operators should also be aware of the cumulative effects of noise levels on the receiving environment, and where practical, take appropriate steps to reduce noise levels from their operation, particularly before 7am and after 6pm.*



# VISUAL AMENITY

## Prevent environmental nuisance

- Ensure that lighting of the premises for security or any other reason does not cause annoyance to the occupants of neighbouring residential areas.
- Control measures for lighting include:
  - design and layout of lights and reflective surfaces
  - brightness of lights/shading of lights
  - height of lights
  - hours of operation of lights.
- Signage is to be compatible with Council town planning requirements for amenity.



# APPENDIX 1 – SPRAY BOOTH REQUIREMENTS

- Spray coating must be conducted in a fully enclosed booth that has an exhaust fan and a filtration system with a particle removal efficiency of at least 90%. The following table lists preferred filtration methods.

| APPLICATION RATE     | FILTRATION SYSTEM  | FILTRATION EFFICIENCY |
|----------------------|--|-----------------------|
| 0-10 litres per hour | Dry (fibre) filter, water scrubber                               | > 90%                 |
| > 10 litres per hour | Water scrubber, activated carbon adsorption & dry (fibre) filter | > 90%                 |

Overspray from large production can rapidly block dry filter pads, therefore where coating application rate is more than 10 litres/hour a water scrubber is the preferred filtration system.

- Exhaust gases must be discharged vertically through a stack with:
  - an internal diameter of not less than 0.5 metres **and**
  - either 8 metres high above the ground or 4 metres higher than the highest ridgeline of the surrounding buildings within 15 metres of the stack, whichever is higher.

Exit velocity of the exhaust gases must not be less than 10 metres per second. The stack must be fitted with an effective rain protection device that does not inhibit the vertical flow of gases.

A monitoring port must be installed at the exhaust stack. *Refer to Australian Standard AS4323.1 (1995) - Stationary Source Emissions. Method 1: Selection of Sampling Positions.*

The above conditions may be adjusted for particular circumstances if warranted by the risks involved. Large continuous spray coating operations and operations very close to sensitive areas may be required to install more advanced filtration system (e.g. activated carbon filter) to reduce the total volatile organic compound (VOCs) levels in the exhaust gases. These operations will be assessed on a case by case basis.

- *For spray booth design requirements, refer to Aust. Standard (AS/NZS 4114.1 and 4114.2:1995) for Spray Painting Booths and check with the Queensland Division of Workplace Health and Safety.*



## APPENDIX 2 – DEFINITIONS

### **Bund**

An impervious embankment or wall of brick, stone, concrete, or other approved material that may form part or all of the perimeter of a compound. For example, a bund may be used to contain spills from a fuel tank.

### **Environmental Harm**

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

### **Environmental Management Program (EMP)**

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

- (a) reducing environmental harm
- (b) detailing the transition to an environmental standard

### **Environmental Management System (EMS)**

Is a systematic approach to managing the environmental aspects of an activity. As a minimum for the lower risk activities administered by Council, an EMS would entail documenting standard operating procedures for the aspects of the activity that may result in environmental harm or nuisance.

### **Environmental Nuisance**

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 Protection Act 1994*.

### **Environmental Value**

- (a) A quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety; or
- (b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation, *Environmental Protection Act 1994*.

### **General Environmental Duty**

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.

### **Material Safety Data Sheets (MSDS)**

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.

### **Regulated Liquid Wastes**

Those wastes that have been identified as unsafe for sewer disposal due to their chemical nature (e.g. flammable). These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998*.



### **Regulated Solid Wastes**

Those wastes that have been identified as unsafe for landfill disposal. These wastes are outlined in Schedule 7 of the *Environmental Protection Regulation 1998*.

### **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.

### **Trade Waste**

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

### **Unreasonable Noise**

An unreasonable noise is one which:

- (a) causes unlawful environmental harm because of:
  - its characteristics
  - its intrusiveness
  - the time at which it is made
  - where it can be heard
  - other noises ordinarily present at the place where it can be heard
- (b) is not declared to be reasonable in and Environmental Protection Policy.

### **VOCs (Volatile Organic Compounds)**

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



## APPENDIX 3 – SCHEDULE 7 - REGULATED WASTES

|  |   |  |
|--|---|--|
| Abattoir effluent                                      | Heterocyclic organic compounds containing oxygen, nitrogen or sulphur | Pharmaceutical substances  |
| Acids and acid solutions                               | Hydrocarbons (oxygen, nitrogen or sulphur)                            | Phenolic compounds (other than solid inert polymeric materials)                  |
| Adhesives (other than solid inert polymeric materials) | Industrial plant wash down waters                                     | Phosphorus   |
| Alkalis and alkaline solutions                         | Infectious substances   | Pickling liquors   |
| Antimony   | Inks  | Polychlorinated biphenyls and related substances                                 |
| Arsenic  | Inorganic cyanides and cyanide complexes                              | Polymeric lattices   |
| Asbestos (all chemical forms)                          | Inorganic sulphur compounds   | Poultry processing wastes  |
| Azides   | Isocyanate compounds (other than solid inert polymeric materials)     | Quarantine waste   |
| Barium   | Laboratory chemicals  | Reactive chemicals   |
| Batteries  | Lead  | Reducing agents  |
| Beryllium  | Lime neutralised sludges  | Resins (other than solid inert polymeric materials)                              |
| Biocides   | Lime sludges  | Saline effluent and residues   |
| Boiler blowdown sludge                                 | Materials or equipment contaminated with infectious substances        | Selenium   |
| Boron  | Mercaptans  | Silver compounds   |
| Cadmium  | Mercury and anything containing mercury                               | Solvent recovery residues  |
| Caustic solutions                                      | Metal finishing effluent and residues                                 | Surfactants  |
| Chlorates  | Methacrylate compounds (other than solid inert polymeric materials)   | Tallow   |
| Chromium   | Nickel  | Tannery effluent and residues  |
| Contaminated soils                                     | Oil interceptor sludges   | Tars and tarry residues  |
| Copper compounds                                       | Oil water emulsions and mixtures                                      | Tellurium  |
| Cytotoxic wastes                                       | Oils  | Textile effluent and residues  |
| Detergents   | Organic solvents  | Thallium   |
| Distillation residues                                  | Oxidising agents  | Timber preservative effluent and residues  |
| Dyes   | Ozone depleting substances  | Treatment tank sludges and residues (including sewage tank sludges and residues) |
| Electroplating effluent and residues                   | Paint sludges and residues  | Tyres  |
| Filter backwash waters                                 | Perchlorates  | Vanadium   |
| Filter cake sludges and residues                       | Pesticides  | Vegetable oils   |
| Fish processing waste                                  | Petroleum tank sludges  | Vehicle wash down waters   |
| Fly ash  |   | Wool scouring effluent & residues  |
| Food processing waste                                  |   | Zinc compounds   |

## APPENDIX 4 – ON-SITE TREATMENT AND REUSE OF WASTEWATER OR STORMWATER

- a) The operator should consult with the Council regarding any system for the collection, treatment and reuse of wastewater (e.g. washdown waters) or stormwater that may be contaminated. This needs to be approved by Council to ensure the method and level of treatment is adequate and safe.
- b) It is generally necessary to test and monitor treated waters to demonstrate effectiveness of the system for Council approval.
- c) Consideration must be made of:
  - volumes to be treated
  - handling and storage
  - key contaminants
  - types of treatment
  - disposal of wastes (e.g. sludge)
  - safety and hygiene
  - testing and frequency.

