

Putting your safety first

**Understanding
paint hazards and
essential precautions**

Surface coatings • Organic solvents • Lead-based paint

Respirators and breathing apparatus • Protecting your eyes • Polyurethanes and lacquers

Safety checklist - part one • Safety checklist - part two

Resene

the paint the professionals use



GLOVE UP!

SOLVENTS CAUSE CANCER

In 1989 the International Agency for research on cancer classified the occupation of painting as a group 1 Carcinogen [causing cancer]

Between three and four thousand estimated deaths are due to industrial cancers every year*

Identify your solvents/carcinogens.

i.e. toluene/xylene

Wear correct protection for the solvents.

i.e. glove up, mask up

Ensure correct ventilation for your site and workplace.

i.e. extractor fans

Remember VOC/s are heavier than air.

i.e. extract from ground level

Be site safe for yourself and other workers.

i.e. remember your work mates

Use less toxic products.

e.g. waterborne instead of solventborne, where possible

GLOVE UP – SOLVENTS CAUSE CANCER!

see www.gloveup.co.nz for more information

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*in New Zealand

Surface coatings

What are paints made of?

The major constituents of most paints can be grouped into four general categories:

1. Resins
2. Pigments
3. Solvents
4. Additives

Substances can enter the body through inhalation, absorption through the skin, or ingestion, with the most common route being inhalation. There is a risk of chemicals entering the body during mixing, application and clean up when using paint.

Spray application presents the greatest hazard as the applicator is not just exposed to the highly volatile portion of the paint (solvents) but also to the paint mist.

What are the hazards?

1. Resins

Resins themselves are not classified as toxic, however, it is possible for some resins to be asthma causing agents and induce inflammation of the mucous membranes and nose.

Some also react with the moist tissues of the respiratory system and eyes, causing irritation, or may be very irritating to the skin.

Although there are a lot of misconceptions about isocyanates, it is important to understand the major health issues and these are addressed under 'Polyurethane paints and lacquers' in this brochure.

The typical effects of overexposure to isocyanates includes chills, fever, flu like symptoms and tightness of the chest.

Epoxies, polyamines, polyamides have been known to cause dermatitis. When skin contact does occur, wash thoroughly with lukewarm water and soap.

2. Pigments

Lead and Zinc/lead chromates: The toxic effects of these are well documented. Lead poisoning symptoms include general weakness, loss of appetite, inability to sleep, irritability, pains in the muscles, joints and abdomen, mental retardation, anaemia, sterility, central nervous system disorders and reproductive effects. Refer 'Lead-based paint' in this brochure for further information. Zinc/lead chromates have been implicated in lung cancer of workers handling these pigments.

Pigments in the finished paint are locked up by encapsulation in the resinous binder, however, sanding creates dusts in which pigments are more bio-available.

3. Solvents

Solvents cause headaches, drowsiness and unconsciousness, irritation to the skin, eyes and respiratory tract, and central nervous system depression with similar symptoms to drunkenness. People can become addicted to some of these solvents and drinking alcohol during the day may increase the toxic risks of these solvents.

Cleaning hands in solvents, such as turpentine, will de-fat the skin and can cause dermatitis and repeated exposure may result in chronic dermatitis.

Most solvents used in paints are highly flammable so care needs to be taken that there are no sources of ignition available to the solvent or to solvent/air mixtures.

Empty drums contain residues of solvents that can be more dangerous than full drums, as the danger of explosion is greater.

4. Additives

Additives may irritate the eyes, skin and respiratory organs.

The spray mist of paints

Whatever the brand or chemical nature of the paint, the spray mist of that paint will contain:

Resins	Pigments
Solvents	Additives

The mist should not be inhaled, should not get onto skin and should not get into eyes.

Hazards in the preparation for painting

Paint stripper

- Extra care needs to be taken with materials containing methylene chloride.
- This chemical is a suspected human carcinogen and can cause permanent damage to skin and eyes.
- Methylene chloride is highly toxic and can cause headaches, nausea, vomiting, numbness, tingling, light-headedness, worsen angina, loss of co-ordination, diarrhoea, abdominal pain, convulsions, unconsciousness, damage to lungs, liver function and kidneys.

Metal pre-treatment

These mixtures often contain phosphoric acid. Because of this, the following hazards exist:

- Corrosive: will burn skin and eyes, permanent damage may result.
- Reacts with metal to produce hydrogen gas, which is highly flammable.

Dusts

- Wood dusts from cutting and sanding can produce eye injury and asthma.
- Hardwood dusts are a suspected cause of lung cancer.
- Concrete/brick dusts from angle grinding can cause silicosis, lung cancer and eye injury.
- Abrasive blasting creates dense clouds of dusts that contain the abrasive itself, pulverised surface paints and abraded substrate material. This can cause serious and irreversible lung damage.
- If silica sand is used as a blasting medium, the resulting silica dust can cause silicosis of the lungs, which is characterised by chronic shortness of breath. Can lead to lung cancer.
- Lead-based paint dust can cause lead poisoning, which can be fatal. Refer 'Lead-based paint' in this brochure for further information.

Welding fumes

- General welding fumes require similar respiratory protection to those for solvent vapours.

Noise

- Exposure to excessively high noise levels over time can result in permanent hearing loss.
- If noise from machinery makes it difficult for employees working next to each other to speak in a normal tone of voice, the workplace noise level is probably too high.

Organic solvents

Under the Health and Safety in Employment Act 1992, if you are an employee, the Act gives you responsibility for your own safety and health at work and employers to provide a safe and healthy work environment.

Organic solvents

Many are volatile. They give off a vapour and will evaporate quickly at room temperature. Not all give out a strong smell.

The word toxic is often used when referring to a harmful solvent.

How do you ensure that there will be no ill effects from solvents used in your workplace? The first step is for both employer and employees to know about and read the Safety Data Sheet for each product used.

Safety Data Sheets

Safety Data Sheets (SDS) should be available at the place of work for all to read. These sheets detail the hazards and set out the precautions for handling the chemical safely.

Consult the SDS carefully.

- Look to see what the components of the product are.
- Check out the toxic properties.
- Follow the safety precautions.

Properties of solvents

Many solvents evaporate and form vapour in the air when containers are left open. Their vapours can be breathed in and lead to health problems.

- Store solvents in strong containers.
- Keep containers sealed or stoppered when not being used.

Many solvent vapours are highly flammable. They will readily create an atmosphere in which a fire can start.

- Work out evacuation routes.
- Keep evacuation routes free of any cluttering materials.

Not all solvents are flammable.

Knowledge of what you are dealing with is vital to the proper methods of handling these and other chemicals.

At all times take special care to:

- Reduce the volume of flammable solvents present as far as possible.
- Prevent spills and leaks.
- Exclude sources of ignition such as naked lights, unsuitable electrical equipment, static electricity hazards, hot surfaces and mechanical friction.
- Reduce the vapour concentration by ventilation/extraction systems.

Health hazards

Solvents can enter the body by three routes.

- Inhaled into the lungs.
- Absorbed through the skin.
- Swallowed.

Inhaling a harmful vapour is the most common route.

Warning signs

The toxic effects of solvents may be noticed immediately, some time later or both.

Acute poisoning

The first effects are:

- A light-headed feeling.
- Slower reaction time.
- Poorer co-ordination, balance and power of reasoning.

Followed by

- Nausea and dizziness getting more and more severe.
- Loss of consciousness.

What to do

- Remove the person or people away from exposure to the vapour.
- Check the first aid instructions on the label and SDS.

Chronic poisoning

After years of repeated exposures, the typical later effects are:

- Mood changes.
- Tiredness.
- Weakness.
- Persistent dermatitis.
- Effects on the liver and kidney.

What to do

If you believe you may be suffering from these effects, see your doctor.

Solvents affect the skin

Solvents dissolve the fat contained in human skin and remove the natural protection barrier.

Solvents can cause skin rashes and repeated or prolonged exposure may result in chronic irritant dermatitis.

What to do

- Use hand cleansers. Do not wash your hands in a solvent.
- Have and use properly designed equipment.
- Wear protective gloves and clothing where necessary.

The risk of injury or disease increases with how long you are exposed to the solvent and how much solvent vapour is in the air.

A good rule of thumb is that the longer the exposure (years) and the higher the dose, the greater the health risk.

Control of harmful solvents

- Use personal protective equipment.
- Protect the skin and eyes.
- Prevent inhalation.
- Avoid working in a confined space.
- Store safely.

First aid

Refer to the SDS for appropriate procedures.

Skin exposure

- Remove contaminated clothing, using appropriate gloves if available.
- Wash contaminated skin with lots of water from a shower, hose or bucket.

Inhalation

To help a victim of over-exposure to solvent vapours:

- Immediately remove the victim from the atmosphere in which the over-exposure occurred.
- Keep the victim warm and quiet.
If unconscious, if breathing is distressed, or if victim is cyanosed (blue in colour):
 - Ensure the airway is open – press the head backwards and lower jaw forwards so that the chin juts out.
 - Place the victim in the recovery position.
 - Support breathing by mouth to mouth resuscitation. Use CPR if necessary.
 - Seek medical attention urgently.

Swallowing

- If conscious, give plenty of water to drink. Do not cause vomiting.
- If unconscious do not give anything by mouth. Remove false teeth, clean mouth of solvent, mucus and vomit. Follow instruction for unconscious victims given above.

- Refer to first aid instructions and the SDS for specific solvents.

Further information can be obtained from AUST: POISONS INFORMATION CENTRE 131 126 or call Resene 1800 738 383.

NZ: NATIONAL POISONS CENTRE 0800 POISON (764 766) or call Resene 0800 737 363.

Splash protection

If solvent gets into the eye:

- Wash immediately with clean running water, lifting both lids repeatedly while doing so and keeping the eye open.
- Continue to wash the eye without break for at least 15 minutes. If the irritation still persists after this, seek medical attention without delay.
- If the affected person is wearing contact lenses, the eyes should be flushed constantly until the person is able to remove these contact lenses.

Further information

For further information refer to 'Practical Guidelines for the Safe Use of Organic Solvents' published by Occupational Safety and Health Service, Wellington.

Safety first

Ask yourself these questions.

1. Are the gloves resistant to the chemicals being used? Gloves that swell and distort allow solvents to penetrate to the skin.
2. Are the overalls impervious to the chemicals being used?
3. Do you need regular safety boots or antistatic boots?
4. Does the process used require earthing straps?
5. Is the work area well ventilated?
6. Where are the extracted fumes going to?
7. Do you have the correct type of respirator for the job? (A dust mask will not protect against solvents).
8. Does the respirator fit? (They are not effective unless a good face seal is being achieved. People with beards, side burns, glasses or missing dentures may need a different type of respirator to ensure protection).
9. Are you wearing your respirator if required? If not, why not? Is it uncomfortable? (A different brand or style of respirator may be more comfortable and therefore more readily worn).
10. Are the cartridges being replaced often enough and is cartridge use being logged?
11. Do you have air-fed respirators when working inside tanks or in other areas where ventilation is poor? N.B. Those working inside tanks must have a 'partner' on the outside.
12. Where is the air supply coming from? Is it really fresh air?
13. If using compressed air, is the air being contaminated by oil from the compressor? Is the intake near a high traffic area where air is laden with carbon monoxide?
14. Are the correct goggles being worn? (Normal safety goggles do not protect the eyes when welding or working around U.V. lamps).
15. Are you removing your gloves and washing your hands before smoking, eating or using the toilet?

Common sense should be used when spraying paint.

1. Always spray with the wind.
2. Use tarpaulins or screens to protect other people from the spray.
3. Never spray toward one another.
4. Use gun extenders to reduce exposure.

What about first aid?

1. Do you know what to do if someone is overcome by fumes?
2. Are eye wash facilities available at all times in the work area?
3. How far away is the shower for washing larger spills off the skin?
4. Do you know what to do if someone swallows a chemical?
5. Do you have a SDS available for each product being used?

What if there is a fire?

When paints, inks and other chemicals burn they decompose. Any nitrogen containing material can evolve cyanide gas when it burns. This includes materials that contain epoxy hardener, polyamide, melamine, polyurea, polyurethane and even natural materials such as wool. Carbon monoxide will be evolved in large amounts from any burning material.

1. Where is your assembly point?
2. If the wind is blowing fumes towards your assembly point, do you have an alternative place to go?
3. In a fire, cans and drums of material nearby can heat up, building up pressure inside. There is a real risk of these containers exploding.

What happens to drums and tins when they are empty?

Even when empty there will be some material around the inside walls of the drum. Depending on the type of chemical it could be dangerous to put water or waste solvents in the drum. Some

materials react with water and this could cause a pressure build up in the drum or even an explosion.

1. Do you take empty drums home to use as incinerators or barbecues?
2. What sort of toxic fumes might be produced when the drums are used in this way?

Medical surveillance

There are a number of tests available that will show if you are being overexposed to certain hazards.

Checks should be done on:

- Hearing.
- Eyesight.
- Blood tests can show levels of lead, cadmium and other chemicals.
- Urine tests will show metabolites for specific solvents.

Are you monitoring your health and the health of any employees?

Further information

Container labels and Safety Data Sheets have information about the possible hazards of the chemicals being used. They advise how the product should be used safely and what to do in the event of an emergency. Resene SDS's are available from the Resene website or call 1800 738 383 in Australia or 0800 RESENE (737 363) in New Zealand.

Lead-based paint

- The removal of lead-based paint can result in harm to both the person doing the job and the people who live or work nearby.
- Untreated lead poisoning can lead to brain damage or even death.

Lead is a health hazard. Small chips of lead containing paint or lead-based paint dust can create health risks. It also can contaminate the environment.

Home renovators often unknowingly create hazards.

Fine lead-based paint particles deposited in soil or household dust can become a constant risk to the health of young children, other household occupants and pets.

Lead enters the body as lead containing dust (produced by sanding or by disturbing flaking or chalking lead-based paint) or lead fumes (produced by heat and burning).

The dangers of lead-based paint

You can get lead poisoning if you do not take care when you remove lead-based paint from the inside or outside of a building. Children, especially preschoolers, are particularly at risk from lead poisoning because they may swallow bits of paint that contain lead or soil that has been contaminated. Children chewing on painted cots or toys are also at risk if lead-based paint has been used.

Until 1965, many paints on the New Zealand market had high lead levels. This was particularly true of pre-1945 paints. Even if a building has been recently

painted, it may have been painted with lead-based paints or have layers of old paint covered by modern paint. Today only special purpose paints contain lead and these are clearly labelled.

During pregnancy lead may cross the placental barrier from the mother to the baby. Some evidence suggests that elevated blood lead levels in the mother might affect the development of the nervous system of the baby and might increase the risk of a premature birth.

It's not possible to tell lead-based paints by their appearance, but there is a simple test that can detect whether the paint is a health risk. If a building was built prior to 1970 it is best to presume that it has been painted with lead-based paint. Contact your local Public Health Office if you are unsure.

Health and safety

The 'Health and Safety in Employment Act' requires employers to provide a safe working environment for employees. Employees and self-employed people are also required to protect themselves and others from harm. This includes contractors.

Lead poisoning

Effects

- Many adults and children with lead poisoning will have either very vague or non-specific symptoms, such as stomach pains, difficulty sleeping, constipation and loss of appetite or no symptoms at all.
- Children who may have no obvious symptoms can still suffer some brain damage over a period of time.

- If your child has more severe symptoms, such as weakness or difficulty walking, seek urgent medical attention.
- Untreated lead poisoning in both adults and children can be fatal.
- Pets often show symptoms of lead poisoning before people. If your pet is unwell and a vet diagnoses lead poisoning, you should see that all members of your household are checked by a doctor.

What to do

If you think your child may have been exposed to paint dust, flakes of old paint, soil with paint dust in it, or may have chewed some old paint, you should ask your doctor to check the child's blood lead level.

Lead may not show up in blood tests if the test is conducted more than one week after exposure, in which case other testing, such as porphyrin analysis, should be undertaken.

Safety points for removing lead-based paint

Whatever method you use for removing lead-based paint, always take the following precautions:

- Keep children and pets away from the work area and make sure they don't eat or play with paint debris.
- If you're removing paint from the inside of your house, remove the curtains and furniture from the room and cover the carpets before beginning the job. After sanding, wet wipe surfaces to remove dust and then use a commercial vacuum cleaner fitted with a suitable dust filter.
- If you're removing the paint from the outside of a building, make sure all windows and doors are closed to prevent contamination inside.

- Collect all paint debris on a ground sheet large enough to contain all the debris. If you're working on a scaffold, tie a sheet underneath to catch falling paint. If you're removing paint by waterblasting, try to collect all flakes of paint from the surrounding area.
- Clean the area around the groundsheet with a vacuum cleaner to collect any other paint debris. Dispose of the contents immediately. After sanding, wet wipe surfaces to remove dust and then use a commercial vacuum cleaner fitted with a dust filter.
- Do not burn paint debris or timber that is coated with paint containing lead.
- Wrap up all paint debris securely in heavy-duty plastic bags.
- Provide short-term secure storage for debris.
- Contact the local Council before work begins. Paint wastes must be disposed of in accordance with local Council requirements.

Protecting yourself

- Wash your face and hands carefully before eating food or smoking and change out of contaminated overalls (especially if dry sanding) when not actually working. Wash contaminated clothes separately.
- Wash your face and hands and change out of contaminated clothing before handling children.
- Wear a hat or cover your head (especially when dry sanding) to prevent dust accumulating in the hair.
- **The quality and efficiency of safety equipment needed to make dry sanding of lead-based paints safe generally means that dry sanding is not possible, or recommended for the DIY'er.**

- Wear a good quality, properly-fitted, toxic dust respirator when dry sanding, making dust, or burning off lead-based paint. If using a disposable type, only those with double headstraps are suitable. Respirators should meet the requirements of the New Zealand/Australian Standard NZS/AS 1716-1991 (Respiratory Protective Devices).
- Do not smoke while removing paint as the hand to mouth contact may increase the risk of eating or inhaling lead paint dust.

Effect of lead on the garden

Vegetables and fruit grown in soil contaminated by lead-based paint are safe to eat as long as they are carefully washed to remove dust and soil from the leaves on the outside of the plant.

If safety precautions haven't been taken, soil may be contaminated and the top layer may need to be removed.

Further information

If you need further information on occupational safety and health matters, contact your nearest Occupation Safety and Health Office.

If you require information on technical aspects of painting, contact your Resene ColorShop or representative.

If you need further information on lead poisoning contact your local Public Health Office and request a copy of 'Guidelines for the Management of Lead-Based Paint' Code 6018. May 1995.

Methods of removing paint

Method	Safety measures
Abrasive blasting.	NOT recommended for properties and structures built or painted before 1970 or for boats because of the lead content of the paint and the large amounts of uncontrolled dust generated.
Blasting: An electric paint stripper, hot air blower or blow torch will heat the paint and blister it, so that it can be scraped off. Note that the use of a blow torch will produce lead fumes. Beware also of fire risk.	Wear a toxic dust respirator if using a hot air blower, blow torch or electric paint stripper. Have a fire extinguisher or water handy in case of fire. If using a blow torch indoors, make sure that windows are open and advise local fire authorities.
Chemicals: Usually used for small surfaces such as window frames.	Wear safety glasses, overalls and gloves to avoid contact with the skin. Keep the room well ventilated. Follow any instructions on the label.
Dry power sanding with a HEPA Vacuum Attachment.	This method is not recommended for a DIYer. It requires skill and can only be done safely by contractors with the appropriate training and experience.
Infra-red: Can be used on all timber surfaces.	This method is recommended where lead-based paint is present because of the low operating temperature. Ensure work area is well ventilated if working in a confined space. No dust is created. Sweep up paint debris and dispose of.
Scraping.	Ensure any debris is collected and the area cleaned up.
Waterblasting: For outside surfaces.	Clean up paint flakes. Use water to flush debris to a collection point for disposal. Prevent debris spreading to other properties.
Wet sanding. This is preferred to dry sanding to reduce dust.	Reduce dust by wetting paint before rubbing down with wet and dry sandpaper. Do not rub down with dry sandpaper and especially not with an ordinary power sander. This will release lead-rich dust into the air and the rest of the house. Ensure that any residue is cleaned up.

Respirators and breathing apparatus

It is not possible to set out precise requirements for every industrial situation where there is an inhalation hazard because the factors that have to be considered vary from one workplace to another. Both the user and the supplier should be satisfied that the equipment selected is adequate for the conditions. If in doubt, you should seek technical advice from your equipment supplier or your local branch of the Occupational Safety and Health Service of the Department of Labour (OSH).

Respirators protect against the following hazards:

1. Dusts

Respirator protection is required for different categories of dust:

Nuisance dusts: These may cause discomfort (i.e. cough or phlegm) or minor irritation of the nose and lungs but are usually not toxic and do not permanently damage the lungs. They pass out of the body or remain in the lungs without poisoning the system. Examples are calcium carbonate (limestone dust), starch and sucrose.

Lung-damaging dusts: Respirable particles of these dusts remain in the lungs where they may damage the tissue. For example, asbestos, crystalline silica (quartz dust) and coal dust.

Irritant particles: Chemically active particulates that cause immediate discomfort, irritating or inflaming the airways to the lungs. Examples are acid or alkaline mists and cement dust.

Toxic dusts: These pass from the lungs into the blood and may poison the whole body. For example, lead, arsenic and powdered organophosphate pesticides.

Sensitising agents: Particulates in low concentration that may cause an allergic reaction. An example is mould.

2. Mists and aerosols

These are fine droplets of liquid dispersed in the air and may contain particles of dissolved substances. Mists are produced by condensation of a vapour or by atomisation of a liquid. Examples are paint spray and chromic acid mist from an electroplating bath.

3. Metallic fumes

These are fine particles of metal, produced by condensation of the vapour, given off by a metal when it is subjected to high temperatures, for example, during welding and smelting.

NOTE: Inhaled particles deposited in the mucus in the respiratory airways will enter the body when swallowed.

4. Gaseous or vapour contaminants

There are three categories of gases and vapours for which different types of respiratory protection is required:

- Acid gases, such as hydrogen chloride and sulphur dioxide.
- Alkaline gases, such as ammonia and diethylamine.
- Organic vapours, such as solvents.

5. Lack of oxygen and confined spaces

Before entering a confined space, it is essential to carry out a full assessment of the likely contaminants and possibility of oxygen deficiency. A decision on the appropriate type of respiratory equipment and other safety factors will then need to be made. For further information, see the booklet 'Safety in Confined Spaces', available from your local OSH branch office.

6. Criteria for selecting a respirator

Three main factors need to be considered when selecting a suitable respirator for a particular situation. They are:

- Contaminant.
- Task.
- Operator.

If you have any doubts as to the correct device for a particular situation, you should seek expert advice from the equipment supplier, your OSH branch office or other authority on occupational hygiene.

7. Medical aspects of wearing a respirator

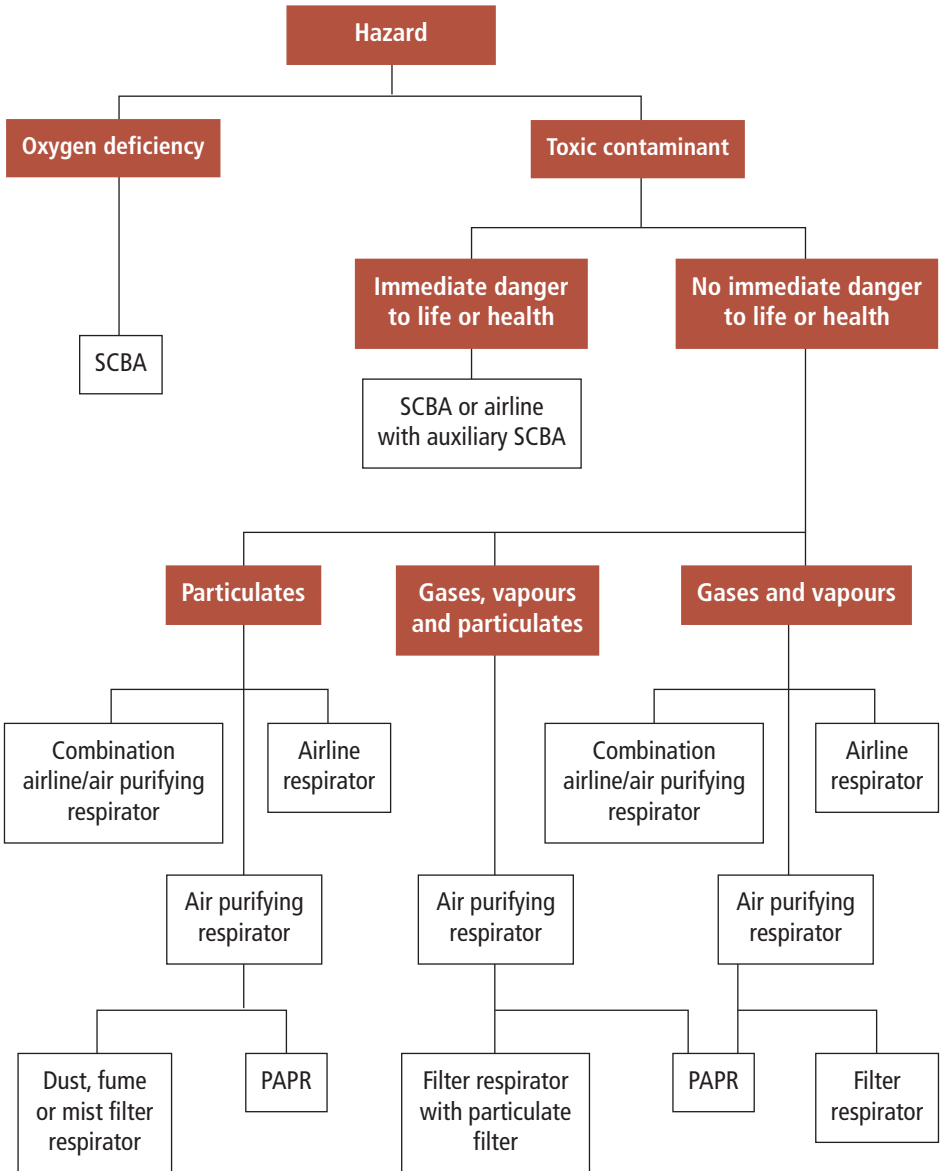
There are some medical factors that may preclude or limit the use of respirators:

- People with impaired lung function may experience difficulty with breathing.
- An asthma attack may be made worse or induced in susceptible individuals.
- People with circulatory disease, such as heart disease and anaemia, may be adversely affected.
- People prone to epilepsy should be aware of the special dangers of wearing a respirator should a seizure occur.
- The wearing of contact lenses or spectacles may restrict the type of respirator that can be worn.
- Psychological factors, such as claustrophobia, may preclude the wearing of respirators.
- Facial characteristics, such as prominent cheekbones, deep skin creases, lack of nose bridge, etc. may lead to respirator facepiece sealing problems.

Further information

For further information refer to 'A Guide to Respirators and Breathing Apparatus' published by the Occupational Health and Safety Service of the Department of Labour, Wellington.

Selection of respirator



PAPR = powered air purifying respirator
 SCBA = self-contained breathing apparatus

Protecting your eyes

Causes of eye injuries

Over 90% of eye injuries are due to four general causes:

1. Being struck in the eye by flying particles and objects.
2. Striking the eye against moving or stationary objects.
3. Eye contact with:
 - Splashes of molten metals, hot liquids, corrosive chemicals, irritant liquids, disease-causing agents.
 - Fumes – corrosive, irritant.
 - Dusts – organic, chemical, abrasive, corrosive.
4. Exposure to welding flash, hot substances, laser beams, infrared radiation, laser reflection.

Treating splashes, fumes, dust, particles in eyes

- Lay patient on floor and pour copious amounts of water gently into the eye while holding the eyelids open.
- Continue for 15 minutes. Get professional medical attention.
- If the patient is wearing contact lenses, don't attempt to remove them before or during the 15 minute irrigation. Usually the lens will be washed out of the eye. If this doesn't occur, the lenses will slide off the pupil and migrate to the back of the eye. They may be safely left there until medical attention is available.

Further information

Contact your local Occupational Health and Safety Office.

Choosing eye protection

Hazard	Examples	Protection	Notes
Thrown particles		Face shield, goggles, glasses with side shields.	Select according to factors: hot or cold particles, high speed or low, hard or soft. See AS/NZS 1337:1992 Eye protectors for industrial applications.
Thrown objects		High-impact face shields, goggles.	Select according to Standard above.
Splashes	Molten metals, hot or very cold liquids, corrosive liquids, chemicals, detergents.	Goggles and masks.	Ensure the goggle or mask ventilation system is splash-proof and the mask fits the face contours. See Standard above.
Dusts	Work with powdered materials, abrasives, dry organic material, chemicals, some corrosives.	Light goggles.	Close fit is important. Ensure any ventilation system is dust-proof. See Standard above.
Fumes	May be corrosive or irritant. Can be produced by hot materials, chemical agents, smog (e.g. automobile exhaust fumes, mainly hydrocarbons).	Goggles and masks.	Lens type governed by other hazard factors. See Standard above.

Note on contact lenses and eye protection: Contact lenses may be safely worn with all types of eye protection, including welding goggles and visors. Contact lenses do not provide protection against eye hazards and must not be considered as a substitute for the appropriate type of personal protective equipment.

Polyurethanes and lacquers

Polyurethane paints and lacquers fall into the following three categories:

1. Urethane oils and urethane alkyds (e.g. polyurethane varnishes)

Urethane oils and alkyds contain no residue of free unreacted isocyanate, so the handling and use of these products is no different to normal solventborne paints.

2. Blocked isocyanates (e.g. some soldering fluxes)

Blocked isocyanate coatings also contain no residue of free unreacted isocyanate, so the application of these materials poses no problems from that viewpoint. However, phenolic solvents may be present in the formulated paint and additional phenolic material may be released during heat curing processes. In these circumstances appropriate precautions for phenols must be taken. These must include protection (adequate ventilation and/or respiratory protection against inhalation of phenolic-containing vapours and suitable protective clothing to prevent skin contact).

3. Polyisocyanates (e.g. one-pack moisture-cured and two-pack isocyanate containing paints)

The great majority of industrial-used polyurethane coatings contain polyisocyanates. This section is concerned with precautions to be observed in the handling and application of these materials.

The two most important isocyanates are toluene diisocyanate (TDI) and 4,4,1 diphenylmethane diisocyanate (MDI).

Mixing

- The mixing of these paints should be in well ventilated areas with the appropriate respiratory protection worn.

Application by brush or roller

- Where MDI class materials are applied by brush or roller, there is unlikely to be a problem from exposure to free isocyanates unless ventilation in the area is inadequate.
- Where TDI class materials are applied by brush or roller the area shall be well ventilated and ori-nasal canister respirators worn. If there is doubt about the effectiveness of the ventilation then positive pressure air-supplied respirators must be used.

Application by spraying

- If you are a spray painter, you need to understand the health risks involved in spraying polyurethane paints and know how to protect yourself against them.
- The liquid paint that comes out of a spray gun is in a fine mist called an aerosol. If you inhale this aerosol, the liquid isocyanate is absorbed into your lungs, and this is when health problems can start.
- Breathing the aerosol of isocyanate-containing paint causes irritation of the nose, throat and lungs. This can happen either immediately on exposure or, more often, later. The symptoms are a dry or sore throat, coughing, wheezing, chest tightness and/or asthma.
- Eye contact causes irritation; it may also cause severe chemical conjunctivitis.
- Skin contact causes a mild irritation which can lead to dermatitis.

Precautions to be adopted for spraying and drying of sprayed articles.

- All spraying and the drying of sprayed articles shall be carried out in accordance with the requirements of the Regulations.
- The spraying of all isocyanate-containing paints must be carried out in a properly designed and constructed spray booth.
- The mechanical ventilation system provided must be interlocked with the air supply to the spray gun.
- When operators, whether spraying or not, are required to work inside a spray booth while spraying is in progress, they must wear an airline respirator.
- The compressed air supply for the respirators must be taken from an uncontaminated source.
- In addition to the recommended respiratory and eye protection, spray operators must wear gloves and a head covering in the case of respirators that leave the hair exposed.
- Mechanical ventilation of the booth must be maintained after spraying ceases until the work area is free of all residual spray mist.

Isocyanate over-exposure

Symptoms

- Sore eyes.
- Running nose.
- Sore throat.
- Coughing.
- Wheezing.
- Fever, breathlessness and cough.

First aid treatment

Inhalation

This may be either from the vapour or from an aerosol. Remove the affected person to fresh air. Keep at rest. Obtain immediate medical attention.

Eye contact

If isocyanate has entered the eyes, flush them immediately with direct mains water or sterile water from an eye wash bottle for at least 15 minutes, holding the eyelids apart. Obtain immediate medical attention.

Skin contact

Wash the skin immediately with copious amounts of water and soap (if available). Remove heavily contaminated clothing immediately. Obtain medical attention if skin dermatitis appears.

Ingestion

DO NOT induce vomiting. If the person is conscious, give between 250ml and 500ml of milk or water to drink. Take to hospital without delay. DO NOT give anything by mouth to an unconscious person.

Removal of polyurethane paint

Sanding down

When isocyanate paints are fully cured, that is, they have been applied for more than 24 hours at room temperature or heated for one hour at 70°C, and are sanded down, the dust produced will not present an isocyanate hazard. This is because fully cured paints contain no free isocyanates. In such instances a dust mask should be worn to provide protection from the general nuisance dust present. Where new paint that may not be fully cured is sanded down, the dust will contain free isocyanates.

A particulate respirator fitted with Class H filters should be worn. Where practical, the use of wet sanding methods is recommended as a means of reducing the amount of dust generated.

Personal hygiene

This is important in any industry where harmful chemicals are used. The basic rules are common sense:

- Wash all splashes of paint or lacquer off your skin at once with soap and water. Try to avoid using solvents as much as possible.
- Do not keep food or eat and drink in the work area.
- Do not smoke in the work area, or if you have paint on your hands.
- If possible, shower before you change into your street clothes.

The employer's responsibilities

The employer must instruct workers on the hazards of working with isocyanate-containing paints and how to use them safely.

The employer is also legally required to provide all the necessary safety equipment.

The employee's responsibilities

Employees have a duty to use all the safety gear the employer provides. Employees owe it to themselves to protect their health – and the job they have spent years learning.

Spillage procedure

1. Put on protective equipment.
2. Cover spillage with absorbent material such as sawdust.
3. Pour on decontaminant mixture, a quantity estimated to be twice the volume of the spill. Refer to 'Approved Code of Practice for the Safe Use of Isocyanates'. (Appendix 3)
4. Allow at least 10 minutes for decontaminant to react.
5. Collect all residues from the spillage and place them in an open container.
6. Add further decontaminant mixture to this material, place a loose cover over the container and remove it to a safe place. Discard residues after one day.
7. Wash down the area with liquid decontaminant.
8. Rope off the area and post 'No Smoking' signs.
9. Clean and decontaminate safety equipment.

Further information

For further information refer to 'Approved Code of Practice for the Safe Use of Isocyanates' published by the Occupational Health and Safety Service, Department of Labour, Wellington.

Related booklets also available from OSH

A Guide to Respirators and Breathing Apparatus • Guide to the Spray Coating Regulations • Welding Safety • How to use Isocyanates Safely (A bulletin for spray painters).

The Resene checklist – part one

Be PaintWise... Tips on how to use up and dispose of leftover paint without polluting the environment.

Got leftover paint? Get with the Resene PaintWise programme!

More than six litres of household paint is sold for each and every person living here every year. That's a lot of paint particularly as much of it is left sitting in paint containers and ends up in landfills. Disposing of paint correctly is important otherwise harmful components may be discharged into groundwater or streams affecting other living animals, fish or plants. There are lots of ways you can reduce this burden on the environment... here's some ideas to get you started:



Reduce:

Buy only the paint you need

The best way to save waste is to avoid buying too much. Carefully measure up the area you plan to paint and use the coverage recommendations on the side of paint cans to check how much you need or ask Resene ColorShop staff for assistance. If you buy what you need and find you have paint left at the end of the job, you have probably applied it too thinly - in which case the best idea is to paint an extra coat to give the surface full protection as a thin coat means that the paint finish will not wear as well. Don't be tempted to buy an unnecessarily large pack size just because it is on special - remember the best deal is the one that gives you just the paint you need.



Use:

Use up all your paint

If you have leftover paint, use it for touch-up jobs and smaller projects or add another coat to your paint finish for extra protection. Waterborne paints are also ideal for creating signs and banners and can be a much cheaper and more durable option than expensive felt pens - this can be a great way to use up any extra paint you may have.



Store:

Store paint so it lasts for years

Brushes or rollers can transfer contamination from the surface you are painting back into the paint. The best way to work with paint is to tip out a small volume into a separate paint pot and use this for painting. Pour out only what you need for the job. This will leave the paint in the main paint container fresh and untouched by your brush or roller. Properly stored paint can last for years. Cover the top of the paint can with plastic wrap, place the lid on securely and store upside down. The paint will create a tight seal around the lid and will remain fresher for when you next wish to use it. Store away from extreme heat or cold. Keep out of reach of children.



Recycle:

Recycle the empty paint container

Once you've used up your paint, recycle the empty steel paint can - simply allow the contents to dry out, then bring to a Resene PaintWise collection centre with the lid off the can so staff can see it is dry and empty. Each paint can you recycle is one less can that ends up in a landfill. If there are no Resene PaintWise collection centres in your area, contact your local council for recycling options.

Most plastic paint containers are recyclable through kerbside recycling but paint residues must be removed. This is best accomplished by scraping the wet paint out. Check with your local council to ensure that kerbside recycling in your area will accept clean plastic paint containers.



Reuse:

Reuse packaging materials

Clean out paint cans and pails and reuse them as paint pots or buckets. Use inside drains (not the stormwater drains) or wash onto your lawn.



Donate:

Donate to charity

If you just can't use your leftover paint, donate it to local community groups, schools, art groups and so on. You'll save them money and get the best use out of your paint leftovers at the same time.

Don't mix waterborne and solventborne paints. If mixed, paint cannot be re-blended or reused.

Make sure you donate the paint in its original container with the contents clearly marked so the recipient knows what they are receiving and how to handle it. Always check paint before you donate it to ensure it is still in good condition. It's best to donate paint as soon as you discover you don't need it, such as when you change your colour scheme, rather than holding onto it just in case.

Handle with care

Properly sealed solvents and thinners have an almost unlimited shelf life. Keep and use.

Solventborne paints require special disposal practices. They are also ignitable and present other hazards. These products must never be poured down storm drains, the household sink (especially if you have a septic tank) or on the ground. Solventborne paint should be disposed of as a household hazardous waste. Hold for a 'household hazardous waste collection day'. If your local community does not undertake such programmes, contact your local Council for disposal guidance.

Paint thinners, turpentine, mineral spirits and solvents should never be poured down a drain or the storm sewer. With the following simple steps, you can re-use these types of products. Let used turpentine or brush cleaners sit in a closed container until the paint particles settle out. Then pour off the clear liquid, which can be reused. Add an absorbent material, such as the PaintWise Disposal Kit material or kitty litter, to the remaining residue until it becomes dry. Finally, contact your local Council for guidance on disposal.

Other environment savers to try

Buy Resene Environmental Choice approved products

These meet specific conditions endorsed by the Ministry for the Environment. Look for the Environmental Choice tick on Resene paint containers.



Resene. Licensed products since 1996

Buy good quality paint

Lower quality paint while cheaper in the short run is a false economy. It will break down quicker necessitating a repaint earlier. The biggest cost of any painting job is the labour - whether this is a painter you hire to do the job for you or your investment of time. It is better to spend a little more on the paint and get a longer life from it than to try to save a few dollars and take years off the paint finish.

Similarly, if you buy a lower quality paint with an expected life of 4-5 years, this means over a 8 year period you will probably have to paint twice. In contrast if you bought a high quality paint with an expected life of 7-8 years you would only need to paint once during this period. The burden on the environment is considerably less with the higher quality paint.

Save unnecessary washing up.

Wrap your brush in plastic wrap or place your roller in a plastic bag, squeeze out the air and tie the bag securely around the handle of the roller using a rubberband or tie top. This will keep the paint fresh while you are taking a break and will save you having to rinse out brushes and rollers repeatedly.

Refer to the Resene DIY info leaflets on how to calculate the paint you need and how to clean brushes and rollers or visit the Resene website for ideas.



Be PaintWise with Resene and we'll all benefit from a healthier environment.

Bring unwanted paint and paint containers into your local Resene ColorShop and let us take care of them for you. Resene will offer good quality paint to community groups for reuse and recycle packaging materials that are recyclable.

Selected Resene ColorShops have been designated as Resene PaintWise collection centres. Drop off your unwanted paint and paint containers to any of these designated Resene ColorShops at any time during their opening hours. Full Resene ColorShop address details are listed on the Resene website.

You are welcome to bring back paint and paint packaging no matter what brand. A small charge applies to non-Resene branded product to help offset the costs of the PaintWise programme (\$1 per 4L can or smaller, \$2.50 per 10L pail).

The Resene PaintWise programme is run by the non-profit Resene Foundation funded by contributions from Resene, a small levy of 15c on retail paint purchases and a levy on trade returns.

When dropping off paint and paint containers:

- Ensure paint is in its original correctly labelled container.
- Ensure containers are well sealed and will not leak.
- Leave small amounts of waterborne paint in its container, put out of reach of children and leave the lid off for the paint to dry then bring it in to one of the Resene ColorShops detailed on this leaflet.

We cannot accept:

Paint thinners, solvents, aerosols or any other materials – dispose of these at a HazMobile collection. See www.hazmobile.govt.nz for details or contact your local council.

Due to safety requirements, paint and paint containers will only be accepted at these Resene ColorShops during normal store hours. Sorry, paint and packaging returns cannot be accepted by any other Resene ColorShops.

Further information

Visit www.resene.co.nz/paintwise.htm or ask your local Resene ColorShop staff.

The logo for PaintWise features the word "Paint" in a grey, brush-stroke style font, followed by "WISE" in a bold, black, sans-serif font. A grey paintbrush icon is positioned above the "I" in "WISE", with its bristles pointing towards the right.

The Resene checklist – part two

Be PaintWise... Tips on cleaning brushes and rollers without polluting the environment.

An easy to use cleaning system

This system is based on the use of two containers in which brushes, roller sleeves and other equipment are first washed and then rinsed. By rotating the containers the solids in the paint are separated from the liquid making it easier to dispose of each component.

This system will work well for both waterborne and solventborne (oil or alkyd) paints. For solventborne paints use mineral turpentine and any other paint solvent recommended by your local Resene ColorShop.

Follow these steps

In the case of waterborne paints:

- At the end of the job wipe or squeeze excess paint onto an absorbent material, such as old rags, shredded newspapers or cardboard boxes.
- Allow to dry and dispose of with household waste.
- Wash brushes, rollers and other equipment with water in a 20 litre or similar sized container.
- The most effective method is to use a roller spinner.
- Transfer the washed equipment to a second container filled with clean water for a final rinse.
- Place lids on the containers or cover in some other secure manner and allow to stand overnight.

By morning the paint solids in the first container will have settled down to the bottom of the

container. The clear water from this container may now be poured onto the garden or any grassed or open area away from streams, rivers or lakes, where it can be absorbed into the ground.

Now to dispose of the paint solids at the bottom of the first container.

Scrape this out onto absorbent material such as old rags, shredded newspapers or cardboard boxes. Allow to dry, then place in a plastic bag and dispose of with the household garbage or take directly to the nearest council tip.

The second container now can be used as the first wash. Use this rotation system until the job is completed.

In the case of solventborne paints:

- Follow the same procedures as for waterborne paints but with these exceptions:
- Use solvents to wash equipment.
- Allow the first container to stand at least 24 hours as it will take this long for the paint solids to settle.
- Do not pour the clear solvent onto the ground – use it to top up the second container or decant and keep for future use.
- Use the least amount of solvent.

Caution

Never allow waste water or chemical solvents from washed paint equipment to enter household or storm water drains or sewers. The waste may find its way into natural waterways where it can reduce oxygen levels and threaten the survival of fish and other aquatic organisms.

Planning ahead

It's a good idea to keep a container of 'dirty turps' on hand for cleaning purposes. Kept in the original container and in a safe place, you will be able to reuse the solvent time and time again. But remember not to shake it up as this will disturb the paint solids which will have settled to the bottom of the container.

Tips for dealing with spills

If paint is accidentally spilt, clean it up as best as you can with a cloth or newspaper. Then wash down with solvent. By cleaning up as much of the spilt paint as you can before washing down you will save solvent and give yourself less work to do.

When moving from one work site to another

A plastic pail with a tight fitting lid is ideal for the short term storage and transport of brushes and roller sleeves. Fill this pail about half way with water so that brushes etc. are covered. This will save you from having to clean brushes and rollers whenever work is interrupted.

Wrapping a paint brush in cling wrap will prevent the paint drying on the brush for at least an hour or so while you take a lunch break. Similarly put your roller into a plastic bag and tape it around the handle.

Resene

the paint the professionals use

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