



## Introduction

WorkSafe is currently conducting an inspection campaign in powder coating businesses with a view to reducing injuries in the sector.

The campaign will involve inspectors visiting powder coating businesses to identify any common safety risks and provide employers with information on how to comply with occupational safety and health requirements.

This newsletter has been developed to identify safety issues in your industry and to assist you in meeting the requirements of the Occupational Safety and Health Act and regulations.

Please take the time to read the relevant parts of this publication and use the checklists to assist you in improving safety in your organisation.

## Hazardous substances

**Hazardous substances are any chemicals or other materials that may put people at risk. They include:**

- chromic acid; and also powder coatings that contain TGIC (for further information on TGIC refer to page 2)
- hydrofluoric acid; (for further information refer to page 4)

Material Safety Data Sheets (MSDS) must be provided for each hazardous substance, identifying the ingredients, and giving health information and precautions for safe use and handling. Continual vigilance is essential.

## What issues are we looking at?

WorkSafe inspectors will be visiting workplaces to conduct inspections of plant, systems of work and as required review occupational safety and health documentation.

Inspectors will be using a checklist (included at the back of this document) during these inspections.

This checklist has been included so you will be able to assess your workplace prior to being visited by an inspector.

Issues covered by the checklists include:

- Hazardous substances- material safety data sheets, ventilation, labels, containers, storage, signs, and personal protective equipment.
- Electrical
- Manual handling
- Mobile plant
- New and young workers
- Consultation
- Slips trips and falls
- Machine guarding
- Pressure vessels
- First aid and amenities
- Fire and emergency safety
- Housekeeping – floors, work benches, ladders, walkways
- Hoses

Further information can be obtained by contacting WorkSafe on 9327 8777 or by visiting the website at [www.worksafe.wa.gov.au](http://www.worksafe.wa.gov.au)

## Personal protective equipment

Control of worker exposure must be achieved by means other than the use of personal protective equipment. However, when other control measures, such as engineering controls and safe work practices, do not adequately protect the worker, then personal protective equipment must be worn.

Personal protective equipment must include full protective clothing including overalls, gloves, head and eye protection and respiratory protection, selected and used in compliance with relevant Australian Standards. In particular:

- a powered air purifying respirator should be worn, which complies with AS/ NZS 1716-1994 Respiratory protective devices, and used in accordance with AS/NZS 1715-1994 Selection, use and maintenance of respiratory protective devices;
- the respiratory protective equipment must provide head covering to avoid dust build-up around the edges of the facemasks. A ventilated full-head covering may also be more comfortable in a hot environment;
- during manual spraying, the gun-hand must not be insulated from the gun. Either a cover sleeve must cowl the gun hand or the palm of an insulating glove may be cut out. Operators standing outside a booth and spraying inside a booth through an aperture must wear this type of protective equipment; and
- anti-static footwear should be provided.

Source Code of practice Spray painting

# TGIC Information

## General information

TGIC is used as a cross-linking agent in powder coatings in the metal finishing industry. TGIC is classified as a hazardous substance and is:

- a skin sensitiser;
- toxic by ingestion and inhalation;
- genotoxic; and
- capable of causing serious eye damage.

Powder coatings containing TGIC are applied by electrostatic spraying.

**People at risk**-Workers who perform the following tasks come into direct contact with TGIC powder coatings:

- filling hoppers;
- manually spraying powder coatings, including 'touch-up' spraying;
- reclaiming powder;
- emptying or cleaning industrial vacuum cleaners;
- cleaning spray booths, filters and other equipment; and
- cleaning up major spills of powder coating.

**Controlling exposure**-Exposure to TGIC can be controlled by a combination of:

- engineering controls;
- safe work practices; and
- personal protective equipment.

Further information on controlling exposure is below.

**Health surveillance**-Health surveillance is required to be provided by the person in control of a workplace where:

- a workplace risk assessment identifies a person as being or likely to have been exposed to TGIC; and
- the exposure places the person's health at risk.

Regulation 5.23 requires that the person in control of the workplace appoint a medical practitioner to supervise the health surveillance.

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## Safe work practices

Safe work practices are necessary to supplement the engineering control measures in order to minimise worker exposure.

Safe work practices must, where practicable, include:

- work practices designed to avoid the generation of dust;
- restricting access to spray painting areas;
- designing a safe workplace so that the spray painter is never between the object to be sprayed and the airflow of contaminated air,
- situating the articles to be sprayed sufficiently within the booth to avoid rebound;
- implementing good personal hygiene practices, for example, powder coating dust should not be allowed to collect on the face, exposed body areas should be thoroughly washed and overalls should be regularly cleaned;
- storing powder coating and waste powder in a designated area with restricted access;
- cleaning booths and surrounding areas on a regular basis;
- promptly cleaning-up spills of powder coatings to reduce the spread of TGIC;
- using a vacuum cleaner with a HEPA filter for clean-up operations and not using compressed-air or dry sweeping;
- using a spark-proof squeegee when a wet clean-up is required;
- emptying vacuum cleaners in the booth and under exhaust ventilation;
- taking care to avoid the generation of dust during disposal of waste powder;
- waste powder being baked in the original box for disposal to landfill as a solid;
- vacuuming as primary decontamination of work clothing;
- checking regularly the cleaning and maintenance of plant and equipment, including ventilation and spray equipment and filters; and
- proper induction training and general training of workers about the potential hazards of spraying with TGIC powder coatings and in the safe work practices necessary to minimise exposure.

# Engineering controls

The most effective engineering controls for reducing worker exposure are enclosure, local exhaust ventilation and automation of the spray process. In particular:

- spray painting of TGIC powder coatings must be performed in a booth (see Australian Standard AS 3754-1990 Safe application of powder coatings by electrostatic spraying) where practical;
- local exhaust ventilation must be used when spraying, during filling of hoppers, when reclaiming powder and during clean-up;
- automatic spray guns, feed lines and feed equipment should be used;
- spray gun air pressure must be minimised to prevent overspray as this could result in unnecessary powder build-up within the spray booth;
- the power supply and powder coating feedlines must be interlocked with the air extraction system so that if a fault develops in the ventilation system, the powder coating and power supplies are cut off;
- the spread of dust within the powder coating building must be minimised.

Circumstances leading to draughts and air turbulence should be evaluated and controls implemented;

- opening powder coating packages, loading of hoppers and reclaiming powder are operations which must be contained to prevent or minimise the generation of dusts;
- the layout of the work station and the size of the hopper opening must be such that generation of dust is minimised in filling the hopper; and
- the following should be considered regarding the use of hoppers:
  - preference should be given to spray systems where the container in which the TGIC is supplied can be used as the hopper, thereby avoiding the need to transfer powder;
  - large hoppers should be used to avoid frequent refilling of smaller units; and
  - powder coatings supplied in drums, which allow mechanical transfer of the powder to hoppers, are preferred to manual transfer.

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## Health surveillance

### What does it mean to the employer?

The employer should permit the appointed medical practitioner to have access to the workplace assessment conducted for the *National Model Regulations for the Control of Workplace Hazardous Substances* [NOHSC:1005(1994)]. This should provide useful information on all workplace exposure factors.

Results of the health surveillance must be communicated to the employee and to the employer as soon as practical so that investigations and, where appropriate, remedial action can be taken.

Employees who have been removed from work with hazardous substances should continue to be provided with information concerning the results of workplace assessment and their health status. Employers should review their training programs.

### Confidentiality and consent

Those providing health surveillance must maintain the confidentiality of the medical records of all employees past and present.

Consent for health surveillance should be sought from an employee before health surveillance commences. Consent should be separate from consent given for any other medical treatment.

Employees should participate in the health surveillance program unless there is some compelling reason to the contrary. In this case, the matter should be discussed with the appointed medical practitioner responsible for health surveillance.

The written consent of the employee has to be obtained before the results can be released to a third party not covered by professional confidentiality.

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## Inorganic chromium (Chromium 6)

Inorganic chromium is a known carcinogen which can cause serious health effects (for more information see Chromic Acid on page 6)

Pre-treatment solutions in the powder coating industry can contain inorganic chromium in the form of Chromic acid.

To identify if the solution you are using contains inorganic chromium check the Material Safety Data Sheets (MSDS) or contact the supplier.

### Health surveillance and inorganic chromium

Where there is a risk to health people working with inorganic chromium under the OSH regulations must be part of a health surveillance program. Health surveillance for inorganic Chromium requires:

- Demography, occupational and medical history and health advice.
- Physical examination with emphasis on the respiratory system and skin.
- Weekly skin inspection of hands and forearms by a responsible person

# Hydrofluoric acid

Hydrofluoric acid is very hazardous and the full extent of injuries may not be obvious for some hours. **Urgent first aid is very important**, even for minor exposure.

How can you be exposed	
skin	<p><b>Health Hazard</b></p> <p>Highly corrosive and toxic by skin contact. The acid is rapidly absorbed through the skin with toxic and <b>potentially fatal</b> effects. Skin contact produces deep and extremely painful burns, with destruction of underlying tissue.</p> <p>Absorption can decalcify bones and cause systemic toxic effects due to calcium and magnesium imbalance, because the HF binds to calcium and magnesium in the body. This can cause heart or other organ damage or failure.</p> <p>It has been estimated that skin exposure to concentrated HF over 2% of body area (about the size of a hand) can be fatal. Recovery from serious non-fatal burns may take a long time.</p> <p>Burns from strong solutions are felt immediately but weaker solutions spilled on the skin may not cause pain for several hours. Workers may have finished work and returned home before feeling pain and realising something is wrong.</p> <p>Fingernails not properly scrubbed can cause acid to be retained under the nails causing burns, absorption into the body and possible nail loss.</p>
eyes	<p><b>First Aid</b></p> <p><b>Wash</b> Prompt decontamination is essential. Flush with running water to wash off all acid, for up to five minutes (preferably using a shower, otherwise a tap or hose.) Remove contaminated clothing, shoes, watch, rings etc as quickly as possible while still under the running water. Make sure that the acid does not spread to other parts of the body or onto the rescuers. Scrub under nails if contaminated.</p> <p><b>Calcium gluconate gel</b> Wearing gloves, apply calcium gluconate gel to the burns as soon as possible after drenching. Gently rub the gel into the contaminated areas and continue to apply fresh gel for at least 15 minutes after the pain has stopped.</p> <p><b>Caution</b> Prevent further contamination of injured person or rescuer. Rescuer protective equipment is essential during decontamination and early management. The injured person may need gloves to prevent hand contamination while showering and applying gel.</p> <p>Note: Even dilute solutions of hydrofluoric acid will rapidly penetrate the skin, destroying the soft tissue and bone underneath. Use of calcium gluconate gel helps to counteract this.</p> <p><b>Seek urgent medical attention.</b></p>
	<p>Immediately flush with water. Remove contact lenses if possible without causing further trauma. If only one eye is affected, make sure that contaminated water does not run into the other eye. Continue flushing with water or irrigate with normal (isotonic) saline during transport.</p> <p>Get to hospital as soon as possible. Continue flushing the eye with water or normal saline while travelling.</p> <p>Calcium gluconate gel supplied for skin burns is not suitable for use in eyes, however sterile 1% calcium gluconate solution may be used in eyes under medical supervision.</p> <p><b>Seek urgent medical attention. Consult an ophthalmologist (eye specialist)</b></p>

Source Bulletin 2-2009 Working with hydrofluoric acid

## Hydrochloric acid bath chemical reaction

An East Perth automotive conversion company premises was evacuated when a 17 year old trades assistant inadvertently put two magnesium alloy crank case covers into a hydrochloric acid bath.

Hydrochloric acid, which is normally used to remove rust from iron, caused a chemical reaction with the magnesium alloy that produced hydrogen gas. The chemical reaction also produced hydrochloric acid fumes and caused the bath to become hot.

The fumes prevented workers removing the crank case covers from the bath and the building was evacuated. The fire brigade neutralised the acid bath and removed the crank case covers.

Fortunately no one was injured in the incident. Hydrochloric fumes are an irritant and can cause tissue damage. Hydrogen gas is highly flammable.

### Factors

The trades assistant did not have adequate training, instruction and supervision.

He was told not to put magnesium alloy parts into the hydrochloric acid bath, but was not instructed of the consequences and emergency procedures.

### Recommendations

Workplaces must have safe systems of work for all employees to carry out their work without being exposed to hazards.

Employers must ensure that safe use, handling, processing, storage, transportation and disposal of substances in the workplace so that employees are not exposed to hazards.

Employers must provide information, instruction, training and supervision so that employees can perform their work so they are not exposed to hazards.

Warning signs of possible hazards must be placed in appropriate areas.

Employees should be familiar with hazardous substances in the workplace. Material Safety Data Sheets must be available and employees should be able to identify the substance and understand the health effects; first aid requirements and medical advice, following exposure; exposure limits; ventilation required' personal protection necessary' flammability; storage and transport; spills and disposal and fire and explosion hazard.

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## Chromic acid

Breathing an aerosol of chromic acid can cause cancer and this route of exposure has created most concern. But the nature of chromic acid (damaging DNA) suggests cancer can be caused through any form of contact. In addition, it is: toxic (poisoning) through skin contact and by ingestion; causes severe burns; and can cause allergic contact dermatitis and asthma.

You must, therefore, establish safe working practices to minimize any risk of contact.

All areas where exposure may occur need to be tackled – from storage through to disposal.

Important factors to consider are:

- Safe storage
- Safe handling and use
- Personal hygiene standards
- Emergency procedures for spills
- Personal protective equipment
- Health surveillance

Source: HSE-Prevention and control of exposure to Chromic Acid

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## Electrical safety

Electrostatic spray painting brings with it electrical hazards and additional requirements for safe work practices are required. For example, all equipment, including spray guns and booths should be earthed. All hooks used to suspend objects to be sprayed should be cleaned prior to re-use in order to maintain effective metal contact.

Earthing of equipment, objects being coated and personnel ensures maximum coating efficiency, reduces free dust and prevents build-up of static charges capable of causing ignition.

# Manual handling

## What is manual handling?

Manual handling means any activity requiring the use of force exerted by a person to lift, lower, push, pull, carry or otherwise move, hold or restrain a person, animal or thing.

Manual handling also includes any activity involving repetitive and/or forceful movements (eg. keying data into a computer; using a screwdriver) and any activity where the person must maintain constrained or awkward postures (eg. driving a truck).

## What is the current legislation on manual handling?

The *Occupational Safety and Health Act 1984* contains general duties and responsibilities placed upon employers and workers to ensure their own safety at work, and that of others who might be injured by the work. These duties extend to the prevention of manual handling injuries.

The Act also requires employers to investigate matters reported to them by employees, determine the action to be taken (if any), and notify the employee who made the report of the action to be taken.

The *Occupational Safety and Health Regulations 1996* require the employer to identify each hazard that is likely to arise from manual handling at the workplace and to assess the risk of injury or harm.

## How can manual handling hazards be identified?

Manual handling hazards can be identified by:

- reviewing hazard/injury reports;
- consulting with workers and safety and health representatives; and
- by observing tasks being performed.

## What is a safe weight to lift?

There is no safe weight. The risk of injury increases as the weight of the load increases. Evaluating the risk posed by the weight of the object needs to take into account:

- how long the load is handled; and
- how often the load is handled; and
- the physical characteristics of the individual

**Manual handling accounts for most lost time injuries in the powder coating industry (based on the five year period total).**

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## Reporting an injuries

All deaths and certain types of injury or disease, in connection with work, must be reported to WorkSafe. Failure to report could lead to prosecution.

Reporting must be done by the relevant employer whenever death or certain types of injury occurs in connection with the relevant employer's business. Relevant employers may include the self-employed, principal contractors, labour hire agents and directors.

In some cases, WorkSafe will require notification of the same reportable death, injury or disease by different 'relevant employers'. For example, if a manufacturer hired a self-employed contractor whose work caused a reportable injury at the manufacturer's workplace, a report would be required from both the manufacturer and the self-employed person.

Reporting is required for:

- employees who suffer death/injury/disease at work or at employer provided residential premises as described under s23G(2) of the Act;
- non-employees who suffer death/injury/disease at a workplace or in connection with the business of an employer or a self employed person; and
- self-employed people who suffer death/injury/disease at work or in connection with work.

Types of injuries that must be reported:

- A fracture of the skull, spine or pelvis.
- A fracture of any bone in the arm, other than in the wrists or hand, or in the leg, other than a bone in the ankle or foot.
- An amputation of an arm, a hand, finger, finger joint, leg, foot, toe or toe joint.
- The loss of sight of an eye.
- Any injury other than those referred to above which, in the opinion of a medical practitioner, is likely to prevent the employee from being able to work within 10 days of the day on which the injury occurred.

## How to report

Notification will be accepted either in person, in writing, by fax, by telephone or email. You can download copies of the forms from the WorkSafe website: [www.worksafe.wa.gov.au](http://www.worksafe.wa.gov.au)

# Checklists

## Hazardous substances safety checklist

check	yes	no	n/a
Register of hazardous substances is complete (contents list and MSDS)			
Register is readily available			
Hazardous substances are properly labelled: manufacturers labels on container			
Decanted containers labelled with name, risk & safety phrases			
Risk assessment has been completed for all substances and recorded in register			
Report is available where risk is significant			
Practicable control measures have been implemented and maintained			
Hierarchy of control is taken into account			
People who may be exposed or work with hazardous substances have been provided with adequate information, instruction and training			
Record of training includes health effects, controls, safe work methods, PPE			
Health surveillance is undertaken where appropriate			

## Electricity safety checklist

check	yes	no	n/a
Electrical installations are installed, constructed, maintained, protected (cover) and tested to minimise the risk of electric shock or fire. Evidence of maintenance and testing in place. Components clearly marked and switchboard free from obstructions.			
Hand held portable equipment is protected by RCD (not construction)			
Switchboard or fixed sockets marked whether RCD protected.			
Maintenance program in place.			
Flexible cords and extension cords are used in a safe manner			
Connection moulded or transparent plug			
Plugs, sockets and extension leads in good condition and protected from damage			
Electrical installations are protected from damage that would increase the risk of electrical shock or fire			
The work is organised for the safety of employees and others at the workplace. Work in the vicinity of power lines and plant			

## Manual handling-lifting safety checklist

check	yes	no	n/a
Practicable control measures have been implemented and maintained to eliminate or reduce risk associated with manual handling work activity: hazard identification, risk assessment conducted, employee feedback			
Accident or hazard investigation is conducted			
Everyone involved in organising and implementing manual handling process or tasks where manual handling hazards have been identified have been provided with adequate instruction and training (induction and ongoing training)			

### Mobile plant safety checklist

check	Yes	no	n/a
Mobile plant is maintained to minimise risks. Log book/records, pre-start checks			
Evidence of training/instruction. License if high risk work.			
The plant is in a safe condition, Eg Plant registration, access to cab, seat & seat-belt, FOPS/ROPS as req'd, loadchart as req'd, operator's manual, controls labelled, guarding dangerous parts.			
Work is organised for the safety of employees and others. Pedestrian control, traffic mgt, 2-way communication as req'd, high-visibility clothing as req'd.			
Site hazards are identified, assessed and controlled (ramps, slopes, rough ground, power lines, excavations, ground load limits, underground services)			

### New and young workers safety checklist

check	yes	no	n/a
Induction, information, instruction & training emergency/evacuation procedures			
Induction, information, instruction & training in hazard and accident reporting			
Induction, information, instruction & training in how to reduce the risk of injury or harm for hazards new/young workers may be exposed to in the course of their work			
Induction, information, instruction & training in use, maintenance & storage of PPE			
Supervision: ensure that new & young workers are working in accordance with safety instructions including instructions re. skylarking, initiation ceremonies, bullying			
Employers ensure the risk of injury or harm to (young) visitors is reduced by means appropriate for the workplace and the type of work activity			

### Slips trips and falls safety checklist

check	yes	no	n/a
Floor or any stair or ramp has unbroken and slip resistant surface. Special provisions for slip resistance provided in wet areas			
Floor or any stair or ramp is free from any obstruction that may cause a person to fall (eg. electrical leads, hoses, floor mounted power boxes in walkways, etc.)			
Access to egress from workplace safe and at all times kept free from obstructions			
Safe systems of work (eg. clean as you go policy) in place			
Warning signs available and erected near spills			
Guard rails or other safeguards provided on ramps and stairs			
Appropriate PPE, such as slip resistant footwear, provided			
Ramps in areas where height of floor levels change and trolley access required or items are carried regularly			

### Hoses safety checklist

check	yes	no	n/a
There should be no damage that affects the structural integrity of the hose eg. Broken wires or kinking			
Bubbles or blisters in the outer covering that indicate leakage are reasons for discarding			
End fittings and crimping should be examined for cracks, damaged threads or other evidence for damage			

### Pressure vessels safety checklist

check	yes	no	n/a
Pressure equipment categorized as hazard level A, B, C or D according to the criteria set out in AS 4343, but not pressure piping must be registered with WorkSafe			



## Machine guarding safety checklist

Check	yes	no	n/a
Is every dangerous part of fixed, mobile or hand held powered plant (machinery) securely fenced or guarded in accordance with Regulations 4.37 and 4.29, except where the plant is so positioned or constructed that it is as safe as it would be if fenced or guarded?			
Are adequate safe work procedures provided and documented to set, test and use machinery during all cycles of production and maintenance? Look for:			
<ul style="list-style-type: none"> <li>Pre-operational checks?</li> </ul>			
<ul style="list-style-type: none"> <li>Presence sensing system: safe system of work documented and a clearly identified warning provided when guard is muted?</li> </ul>			
<ul style="list-style-type: none"> <li>Presence sensing system: inspection and maintenance records maintained?</li> </ul>			
<ul style="list-style-type: none"> <li>Appropriate isolation and lock-out procedures provided for maintenance?</li> </ul>			
<ul style="list-style-type: none"> <li>Where setting, testing and start-up of machinery is required with the final means of safeguarding removed, have interim safeguards been provided?</li> </ul>			
<ul style="list-style-type: none"> <li>Where fixed physical guards are provided is adequate provision made for cleaning, maintenance, adjustment and repair?</li> </ul>			
<ul style="list-style-type: none"> <li>Where it is not practicable to guard machinery is a safe system of work in place for persons operating or passing in close proximity?</li> </ul>			
Are operators and maintenance personnel properly trained, familiar with the operation and set up of the machinery and able to demonstrate safety features?			
Are manufacturers decals, manuals and operator instructions readily available and in the English language?			
Is the highest level of guarding that is practicable being provided?			

## Other issues safety checklist

check	yes	no	n/a
Notifiable accidents reported to WorkSafe			
LTI/LTD accidents and notified hazards investigated			
Employees have received induction and on the job training			
Passages/walkways kept free of obstructions			
Access and egress (emergency exits) kept free of obstructions			
Emergency egress enable safe egress in event of emergency / exit signs provided			
Portable fire extinguishers provided and maintained			
Evacuation procedures & diagram available and displayed and practised and training in the use of fire extinguishers provided			
Warning signs provided			
Cleanliness and removal of debris			
Surface and floors are unbroken and slip resistant to prevent slips and falls			
Seating provided and maintained			
Workplace facilities provided			
Portable ladders according to AS 1892.1 (metal) or AS 1892.2 (wooden)			
Gas cylinders secured			
Flash back arrestors are fitted (oxy-acetylene or oxy-LPG)			
PPE provided where necessary			
Instruction, information, maintenance, storage of PPE, sign			
Noise <ul style="list-style-type: none"> <li>Noise assessment conducted</li> <li>Control measures in place / avoid noise above exposure standard</li> <li>Provision of personal hearing protection (PHP)</li> <li>Instruction fitting, use, selecting, testing, maintenance and storage PHP</li> <li>Training on noise</li> </ul>			
Signage PPE according to AS 1319			
First Aid box or facilities available and first aid trained person available			
No smoking in enclosed workplaces			
Location of any asbestos on site identified and the risk assessed			

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