Chapter 20
Spray painting

The hazard

Spray painting (and powder coating) includes processes where there are many hazards associated with the work. These include:

- Confined spaces
- Electrical safety
- Fire and explosion
- Hazardous manual handling
- Hazardous substances – breathing in fumes
- Heat
- Injection injury
- Noise.

The Regulation

There is no specific Regulation for Spray Painting – but various hazards e.g. noise is covered by Regulation. The Code of Practice includes information on:

Hazardous chemicals	Dermatitis, respiratory illnesses and cancers, some hazardous chemicals are also fire and explosion risks	Paints, solvents, adhesives, resins, rust removers, rust converters, lacquers and degreasers
Fire and explosion	Serious burns and death, exposure to projectiles and damage to property	Flammable paints and solvents in contact with an ignition source, combustible dusts used powder coating
Confined spaces	Exposure to hazardous chemicals, unsafe oxygen levels, potential for fire, explosion and engulfment	Spraying inside the cavity of vehicles, ships, aircraft or tanks
Machinery and equipment	Injection injuries, being caught by moving parts of machinery can cause fractures, bruises, lacerations, dislocations, permanent injuries or death	Spray booths, sanding, grinding equipment, airless spray equipment, compressed air
Working at height	Falling objects, falls, slips and trips of people can cause fractures, bruises, lacerations, dislocations, concussion, permanent injuries or death	Spray painting trucks, ships, aeroplanes or bridges
Manual tasks	Overexertion, sustained awkward postures or repetitive movement can cause muscular strain	Repetitive spraying action, lifting and pushing objects into place
Electricity or static electricity	Exposure to electricity can cause shock, burns or death from electric shock, electricity and static electricity are also sources of ignition	The use of electrical equipment, wiring of equipment and electrostatic charges
Heat or high humidity	Exposure to heat or high humidity can cause burns, heat stroke and fatigue	Wearing impervious PPE or working outdoors or in a poorly ventilated workplace
Noise	Exposure to loud noise can cause permanent damage to hearing	Noise from pumps, compressors and spray booths

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Labels and Safety Data Sheets contain important information:

Hazard statements	• May cause cancer • Fatal if inhaled • Flammable liquid and vapour • Causes severe skin burns and eye damage • May cause respiratory irritation
Pictograms	 Flammable Acute toxicity Warning Human health Corrosive
Precautionary statements	• Use explosion proof electrical equipment • Do not breathe vapours • Do not get in eyes, on skin or clothing • Use only outdoors or in a well ventilated area • If on skin, wash with plenty of soap and water

All these risks must be controlled.

Reduce the risks to our lungs from spray painting

In this section information is given about the risk of breathing in hazardous substances, especially in body shops. But the same principles apply wherever the spray painting is done. One of the major hazards are isocyanate containing paints.

Isocyanate is used as a hardener, in some water-based paints and almost all lacquers (clear coats). Remember that "water-based" does not mean "isocyanate-free".

Breathing in isocyanate paint mist can cause asthma, and vehicle paint sprayers are about 80 times more likely to get asthma than the average worker. The main source of isocyanate exposure is during spraying, but it may also occur when cleaning the spray gun and from baking.

Early symptoms include one or more of the following:

- Recurring blocked or runny nose
- Recurring sore or watering eyes
- Chest tightness, often occurring outside working hours
- Persistent cough.
- Wheezing
- Breathlessness.

Continued exposure may lead to permanent and severe asthma.

For those workers who become sensitised, breathing in the smallest amount of isocyanate may trigger an asthma attack.

Essential controls

If it is not possible to use paints that are free of hazardous chemicals, then it is essential to have:

1. Spray booths and rooms

Restrict paint spraying to a properly designed spray booth or room. A paint spray gun creates a visible fan of paint, and large quantities of paint mist that is invisible under normal lighting. The mist spreads through the whole spray enclosure because the ventilation air is overwhelmed by the spray-gun air jet and cannot instantly remove the paint mist. Special lighting can show up this mist.

The time taken for mist removal is known as the "clearance time". Typically, a booth clears in less than 5 minutes; a room can take 20 minutes or more.

2. Working procedures

Never spray isocyanate-containing paints in an occupied workshop or spray without an air-fed breathing apparatus (BA). Even very small jobs will create high-exposure peaks. Air-fed BAs should be worn by anyone present in the booth or room during spraying, and throughout the clearance time.

Many sprayers lift their visors soon after spraying to check the work quality, not knowing they are still surrounded by invisible paint mist. This can cause significant exposure and should be prevented.

To leave a booth or room safely during the clearance time:

- Walk to the pedestrian door wearing air-fed BA. The air hose must be long enough, and the connection point by the door.
- Open the door, unplug the airline and hang it next to the door.
- Step out, shut the door and remove the air-fed BA.

When gun cleaning, spray-to-dry in the booth or room wearing an air-fed BA. Extraction ventilation is essential for gun-cleaning machines that create mist.

3. Appropriate personal protective equipment

In many cases this will be air fed hoods e.g. if isocyanates are used. see Chapter 18 – Respiratory Protection.

4. Regular checks of the ventilation systems (air speeds, fans etc.) to confirm that the controls are working properly.

5. Health monitoring

For workers who may be exposed to isocyanates, regular monitoring of lung function is important as sensitization may occur from low exposures.

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What can HSR(s) do?

The Spray Painting Code of Practice is a good place to start as it has many solutions and discusses most of the hazards.

Remember: The PCBU/employer has an obligation to consider your views when making a decision and to inform you and the work group of their decisions. And don't forget your powers – see Chapter 1, Section 1 on HSRs.

Further information

UK Health and Safety Executive publication – Safety in motor vehicle repair: Working with isocyanate paints

Spray Painting Code of Practice – https://www.safeworkaustralia.gov.au/doc/model-code-practice-spray-painting-and-powder-coating