

Safety Hazards

Spray Painting

On this page

[What is spray painting?](#)

[What are some hazards associated with paints and spray painting?](#)

[How can chemicals enter the body?](#)

[What should I do before spray painting?](#)

[How can the hazards of spray painting be controlled?](#)

[What are some general operational safety tips?](#)

[What is refinishing?](#)

[What are the safety tips for refinishing?](#)

[What should I do if I am a spray painter?](#)

[What are some general precautions to know when using personal protective equipment \(PPE\)?](#)

What is spray painting?

Spray painting is a technique in which coating materials are sprayed through the air using compressed gas to apply paint as a solid, aerosol, or liquid onto a surface. This technique is known as air-atomized spray painting, and other applications include electrostatic techniques, airless spraying, and High-Volume, Low-Pressure (HVLP) spray painting. These applications can be found in shops that do auto body work, furniture painting, woodworking, sign painting, sandblasting, and metal fabricating.

Spray painting generates mists and vapours, which can affect the health of workers.

What are some hazards associated with paints and spray painting?

Paint contains many ingredients, including pigments, binders, extenders, solvents, and additives. There can be many different ingredients, such as dispersants, silicones, thixotropic agents, driers, anti-setting agents, pesticides, bactericides, fungicides, and algacides. The exact hazards of the paint will depend on its formulation. Check the [safety data sheet](#) (SDS) and label for information about the products you are using.

Hazards associated with spray painting include:

- toxicity from paints and other hazardous chemicals
- fires and explosions
- working with compressed air (from spray guns)

It is important to know what type of paint is being used and the hazards it may present. For example, polyurethane paints often contain isocyanates, which are highly toxic. Inhaling isocyanates can result in severe irritation of the eyes, nose, throat and lungs, and shortness of breath. Isocyanates have been associated with the high possibility of sensitization, resulting in asthmatic or other allergic symptoms, even at very low exposures. Workers can also be exposed to other chemicals, including xylene and toluene. Some health effects from exposure to these chemicals can include dizziness, eye and skin irritation and dermatitis, with long-term effects resulting in kidney and liver diseases.

How can chemicals enter the body?

For a chemical to harm a person's health, it must first come into contact with or [enter the body](#), and it must have some biological effect on the body. There are four major routes by which chemicals may enter the body:

- Inhalation (breathing)
- Skin (or eye) contact
- Swallowing (ingestion or eating)
- Injection (skin penetration)

Workplace chemicals can enter the air in a number of different ways, including gases and vapours, which can contaminate the workplace air. These contaminants include tiny liquid droplets that can float in the air (mists) from sources such as paint spray mists from painting operations, as well as dust, fumes, and smoke.

What should I do before spray painting?

Before beginning any spray painting operation, a risk assessment should be conducted to identify hazards, analyze and evaluate the risks associated with the hazards, and implement control measures using the hierarchy of controls, at the source, along the path, and at the worker.

Employers must make sure that workers receive WHMIS and other relevant training.

- Make sure workers are trained in the use and care of and wear appropriate personal protective equipment (PPE), including approved respirators, coveralls, gloves, and eye and face protection.
- Refer to safety data sheets (SDSs), standards, and regulations and follow precautions for all products used, especially isocyanates.
- Ensure fire escape doors from the paint room are accessible and clear before beginning the work.
- Use a high-volume, low-pressure (HVLP) system. HVLP systems reduce respiratory and skin exposure and are more efficient with paint, primers, etc.
- Use only properly grounded spray paint equipment.
- Check the compressor's pressure gauge periodically. Do not allow the pressure to exceed the recommended level.
- Make sure that the ventilation systems are operational and the filters are not blocked. Downdraft ventilation spray paint booths have a lower concentration of paint overspray and a cleaner paint finish that requires less buffing.
- Clean and replace respirator filters regularly.
- Allow the ventilation system to run for several minutes before turning on the heat lamps.
- Store no more than one day's supply of paint near the spray area.
- Do not spray paint near grinding or welding operations or any source of ignition.
- Do not paint with heat lamps on.
- Do not use compressed air to blow debris and other materials from clothes.

How can the hazards of spray painting be controlled?

The types of controls will vary depending on the exact methods and facilities present.

- Follow all regulatory requirements for spray booths, including requirements in relevant occupational health and safety legislation, the Building Code, and the Fire Code.
- Provide adequate and suitable equipment and facilities.
- Follow the manufacturer's directions for setting up, cleaning, and maintaining the spray system, spray guns, and spray booth ventilation.
- Make sure there is appropriate ventilation.
- Eliminate ignition sources (such as open flames, welding torches, electrical outlets, heaters, motors, static electricity, smoking, etc.).
- Use non-sparking equipment and make sure the equipment is grounded and bonded.

- Use barriers to help separate workers from the hazard where possible.
 - Provide fire extinguishers.
 - Conduct an indoor air quality test to make sure the ventilation is functioning appropriately.
 - Store paints safely, including keeping containers closed, away from heat or ignition sources, and storing at room temperature.
 - Develop and implement safe work procedures, including a spill containment procedure and equipment for spill cleanup.
 - Educate and train workers about safe work practices and control measures.
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What are some general operational safety tips?

- Use tools and service equipment only for the tasks for which they are designed.
 - Keep power tool guards and safety devices in place and functional.
 - Store personal protective equipment (PPE) in a safe, clean, and easily accessible place.
 - Inspect and service fire extinguishers and first aid kits regularly.
 - Provide emergency eyewash stations or showers where appropriate and keep them clean from dirt and debris.
 - Post emergency phone numbers.
 - Organize and store all tools, equipment, and materials in appropriate places after use.
 - Keep floors and benches clean to reduce slipping and tripping hazards.
 - Discard rags, paper and other items soaked with flammable materials (such as oil, gas or solvents) in approved metal containers, and empty the containers regularly.
 - Follow the general requirements when storing materials.
 - Do not store or eat food or drinks in work areas where they may become contaminated.
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What is refinishing?

In a spray painting operation, successive coats of paint are applied using spray guns to obtain the desired result. When used in refinishing, automobile spray guns atomize paint with compressed air and apply a paint mist to the surface. This application is followed by drying and heating the painted surface, sanding the surface, and applying the next coat. The process may be repeated until the desired result is obtained, including the use of fine-grade paper to sand primer and the application of sealant and topcoat.

What are the safety tips for refinishing?

When refinishing:

- Use vacuum sanders or specially ventilated workstations, when possible, to reduce exposure to dust.
- Wear appropriate chemical-resistant gloves and respirators when using solvents or chemicals or when mixing paints.
- Use non-hazardous cleaning products to remove paints that have spilled on the skin.
- Launder or dispose of any clothing that hazardous products have contaminated before using it again.
- Close all containers immediately after their use to minimize vapour being released into the air.

What should I do if I am a spray painter?

Evaluate the work area for existing and potential hazards and implement control measures for the identified hazards and associated risks.

Know how to prevent injury from electrical hazards. Keep tools and equipment and their safety features in good working order.

Know how to recognize when the ventilation system is working (or not working).

Practice safety procedures for:

- Working at heights
- Using ladders
- Lifting
- Repetitive physical tasks
- Know how to report a hazard
- Select less harmful substances or products where possible.

What are some general precautions to know when using personal protective equipment (PPE)?

It is very important to follow the manufacturer's guidelines regarding the personal protective equipment and clothing that should be used when handling paints or pesticides. For further information, refer to the OSH Answers document [Designing an Effective Personal Protective Equipment \(PPE\) Program](#).

When using personal protective equipment while spray painting:

- Protect yourself from sharp edges and protruding parts.
- Wear gloves and cover sharp objects with tape, rags or wooden guards.
- Care for all PPE according to the manufacturer's recommendations.
- Store respiratory protection in a clean, dry area when not in use.
- Hang fall protection system items, lanyards, and harnesses up after each use.
- Regularly launder coveralls.
- Inspect and replace any PPE that is damaged or defective.
- Special ventilation systems, respirators or separate supplied air (breathing air) may be required when working with certain chemicals or paints (e.g., isocyanates).

For example, certain pesticides are used as preservatives to protect paints and coatings from spoiling both in the can and once applied to the surface. Professional painters using an airless sprayer should wear cotton coveralls over a long-sleeved shirt and long pants, chemical-resistant gloves, a painter's hat, and a respirator with National Institute for Occupational Safety and Health (NIOSH)-approved organic-vapour-removing cartridge with a prefilter for pesticides, or a NIOSH-approved canister approved for pesticides during paint application.

Fact sheet first published: 2025-12-31

Fact sheet last revised: 2025-12-31

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