

# Powder Coating



Powder coating may look benign, but it still involves all the elements for a potential explosion: fuel from the powder-to-air mixture, ignition due to poor grounding, and the use of compressed air for application.

Although the powder is nonflammable, in an atomized state, the powder can support a fire. The powder becomes atomized when it goes through the spray gun so it's important for users to be diligent when spraying in order to prevent an explosion. Due to the hazards associated with powder coating, OSHA and NFPA require the use of an approved spray booth.

## Construction

Walls, doors, ceilings, and floors must be constructed of non-combustible material of 18-gauge metal or heavier. The material should be smooth to facilitate ventilation and cleaning. Three feet of clearance should be maintained on all sides and above the spray booth. The booth should be kept free of any storage or combustible material. All doors leading into the booth should have a fire rating of least one hour. Conveyor openings, if applicable, should be as small as possible.



## Ventilation

Ventilation should provide a sufficient airflow to maintain the powder concentration of less than half the minimum explosive concentration. Ducts should be constructed of steel or smooth and sealed concrete. Exhaust fans should be nonferrous, and the electrical motors should be explosion proof. A booth can either be equipped with an open collection system or closed collection system. Open collection systems don't have venting requirements. While these types of systems will allow the powder to burn, an explosion will not occur. A closed collection system requires venting to an area outside the plant or an explosion suppression system.

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## Electrical

All electrical fixtures, switches, and junction boxes inside the booth must be UL-listed explosion proof and meet NFPA 70 standards. Electrical hazards can be prevented by making sure the contact between the workpiece, carrier jigs, and conveyor are designed and regularly tested to ensure an adequate ground is maintained at all times. Automatic shut down or warning systems should be installed, wherever practical, to constantly monitor the efficiency of the grounding system between the jig and the conveyor. Floors and other surfaces with which operators can make contact should be conductive or coated with conductive floor compounds and coatings. As an alternative to physical grounding of the workpiece, ionizing devices can be used to discharge any accumulated electrostatic charges. Operators should wear anti-static overalls, non-insulating gloves, and anti-static footwear. Additional devices, such as portable fans, heaters, radios, portable electrical light fixtures, and unapproved extension cords, should not be located in the booth.

## Fire Suppression

**All spray booths, exhaust plenums, exhaust ductwork, and area behind filters should be protected by an automatic fire suppression system.** The extinguishing system can be water, foam, carbon dioxide, dry chemical, or a gaseous agent, but they must meet all applicable NFPA requirements for those specific systems. According to NFPA 33, automated powder application equipment must be protected by a listed optical flame detection system. The system will stop the conveyor and shut down the ventilation and equipment in the event of a flame.

## Maintenance

It's important to regularly clean powder buildup from fixtures and racks. If there's a significant buildup of powder, a resistance to grounding can occur. A cleaning schedule should be implemented since **poor grounding is the number-one cause of fire.** Compressed air should NEVER be used to clean up powder.

## Powder Storage

All powder, with the exception of a day's supply, should be kept in a separate room that has a minimum of one-hour fire-rated walls, ceiling, and door. All wiring in the room must be approved for Class II Division 2 locations.

## Worker Safety

Powder coating dusts are harmful to health in many ways. They're known to cause adverse skin reactions, eye injury, and respiratory illness. OSHA Respiratory Protection Standards should always be followed. An approved particulate respirator for filtering out airborne particles should be worn, as well as additional personal protective equipment that includes eye, face, and neck protection. Hoods with face coverage have been designed for protection in this environment.

