

Electrical Earthing

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Inadequate earth is the most frequent problem which we encounter in troubleshooting a powder coating system. A sufficient earth path must be provided for all equipment associated with powder coating application, the parts to be coated and any manual operators. The reasons are simply safety and efficiency.

Electrical Earthing Safety, when Powder Coating

Earthing is necessary to carry charge away from the application equipment to prevent static discharge or sparks which provide an ignition source and may lead to a dust explosion. This is one of the most serious safety hazards associated with powder coating. It is not limited to corona systems since tribo is also an effective charging process. All automatic powder coating systems must be equipped with spark detection equipment to shut down the spray guns in the event of a discharge. (It's important to note that poor earth is not the only possible spark source. Others include faulty spray guns or charging equipment.)

The earthing of spray gun operators helps to prevent shocks as well as sparks. Our bodies can collect charge and deliver it in the form of a spark, just as we do in dry winter months when we walk across a carpet and touch a conductor. The result is a shock accompanied by a small spark discharge.. Conductive shoe soles and grounding straps can help prevent shocks from static build up in operators.

Electrical Earthing Efficiency when Powder Coating

Good earth is required to carry away charge which is delivered to the parts by the powder coating or through ionized air. This allows more powder to be deposited and better penetration into Faraday areas. Overall, however, good earth improves transfer efficiency.

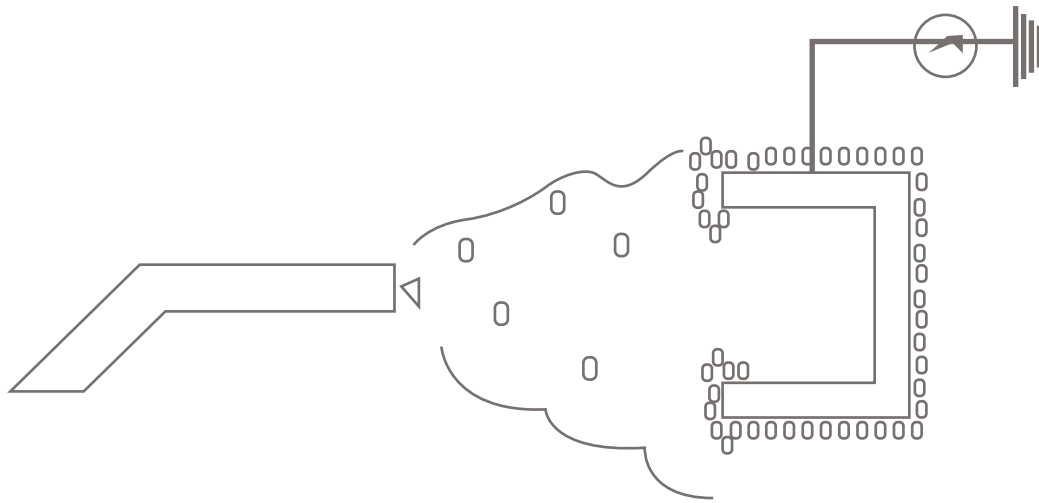
As powder coating builds up on the surface of the part, charge separation begins to occur in the part. That is, in the case of a negatively charged powder, positive ions in the part flow toward the powder coated surface and electrons carrying a negative charge flow to earth. In order to continue powder attraction to the part the earth circuit must stay intact. Thus earth maximizes the powder (charge) holding capacity of the part. If minimal earth is improved even greater efficiencies are possible.

Causes of Poor Earth when powder coating

Most earth problems are the result of poor design or inadequate maintenance. Some powder coating booths, for example, may not provide enough air movement to capture the over sprayed powder. Powder which drifts out of the booth canopy may settle on the conveyer or load bars. Powder coating is a very effective electrical insulator and it will interfere with earth if deposited at contact points. This is especially true if coated hooks or hangers go through the oven and the powder is cured in place. If load bars hang too low into the coating booth they too will get powder coated.

Another important design feature involves hook/hanger configuration. S shaped hooks, depending on size, may provide only a single contact point and allow the part to change position. V shaped hooks, for example, can offer at least two contact points and hold the part more firmly in place to prevent undercoating with powder. When possible the hooks/hangers should be designed to shield the contact point from the powder coating. Hooks/hangers made from square stock should be turned on an angle to have a sharp contact point.

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Powder coating is applied electrostatically using either a fluidised bed or electrostatic spray guns. The substrate is earthed and the powder coating is charged, the powder sticks in a wraparound effect to the substrate.