

APPLICATION PROBLEMS

1. Poor Penetration into Recessed Areas (Faraday Cage Effect)

- The Faraday Cage Effect occurs when surfaces closer to the gun attract the powder before it can penetrate into corners and recessed areas.
- Turn electrostatic settings down.
- Increase or decrease the powder delivery air setting.
- Check your ground. Hooks with heavy coating build up will become insulated from the part.
- Adjust powder spray pattern with different nozzles.
- Increase the powder feed velocity to penetrate the recessed area.
- Adjust gun placement, so powder cloud has more direct access to area.
- “High Fluidity” powders provide better penetration.

2. Inadequate Film Thickness

- Increase electrostatic setting.
- Adjust gun placement closer to the part and try different nozzles.
- Adjust part density (racking) so that powder can be attracted equally to each part.
- Excessive air velocity may be blowing powder past the part.
- Poor ground. Check your hooks.
- Excessive humidity may limit the charge on the powder particles.
- Powder may be too fine. Always maintain a consistent blend of virgin and recycled powder. Contact your Diamond Vogel Technical Service Representative for a particle size analysis.
- Some powder technologies charge better or are meant to be applied as thin films. Contact your Diamond Vogel Technical Service Representative.

3. Back Ionization

- Back ionization occurs when powder layers start being repelled from the part during application.
- Turn electrostatic settings down.
- Excessive powder build up can cause back ionization. Lower powder feed rates and adjust gun distances.
- Check your ground.
- Having gun too close to the part.

4. Poor Fluidization in Hopper

- Air should be slowly percolating through the surface of the powder.
- Check your fluidizing membrane for plugged pores. Can be caused by moisture or oil in the air supply.
- Increase air pressure to fluidizer.
- Check for packed powder by stirring manually with a paddle or air.

5. Powder Blowing Out of Hopper

- Lower air pressure in fluidizing hopper.
- Powder may be too fine. Consult Diamond Vogel Technical Service Representative for a particle size analysis.
- Check hopper for proper venting.

6. Geysering

- Geysering is caused by air blowing holes through the surface of the fluidized powder.
- Lower air pressure to the fluidizer.
- Add more powder. Hopper should be about $\frac{3}{4}$ full when fluidizing.
- Check for plugged pores or other obstructions in membrane.
- Powder may be packed or moist. Check air supply for contaminants.

7. Impact Fusion

- Impact Fusion is the hard build up of powder particles that occurs in hoses, tubes and nozzles. Clean and replace tubes, hoses, venturi pumps, and nozzles on a regular basis.
- Powder may be too fine. Reduce your reclaim.
- Excessive air pressures and powder feed rates will increase the amount of impact fusion.

Check air supply for contaminants.

8. Surging or Inconsistent Powder Flow

- Increase air pressure and/or volume of air.
- Check powder hoses for kinks or obstructions. Keep hose length to a minimum. May need to replace powder hose with a smaller inside diameter hose.
- Clean all tubes, hoses and guns of impact fusion build up.
- Check powder delivery and air pressure settings.
- Check hopper for powder level and fluidization.
- Check air supply for contaminants.
- Excessive temperature and humidity in application area can cause application problems.
- Check for sintering or clumping in powder.

9. Poor Spray Patterns or Powder Feed

- Replace worn feed tubes, orifices, and deflectors in spray guns.
- Clean impact fusion from areas of accumulation.
- Increase powder feed (see section 8)
- Choose correct nozzle for part configuration.

10. Powder Drift From Spray Booth

- Clean or replace filter cartridges and final filters.
- Check pulse air pressure and for contaminants in air supply.
- Excessive drafts or pressure from outside the spray area causing turbulence.
- Using excessive amounts of compressed air during clean up.
- Insufficient air volume or velocity in recovery/reclaim.
- Excessive amount of fines.
- Part temperatures in excess of 110°F may produce a “chimney effect”.
- If guns are added to a booth or flows are run at their maximum it may exceed the filter surface capacity and lead to powder migration out of the booth. Decrease flow rates.

11. Spitting and Dry Spray of Metallics

- Spitting is caused by particles collecting on the diffuser and electrode.
- Periodically clean the electrode with air and adjust KV's and powder delivery.
- To reduce dry spray, adjust KV's and lower delivery volume and powder velocity.
- Control film thicknesses for more consistent color.
- Check KV Output at the gun.

FILM PROPERTY PROBLEMS

12. Excessive Orange Peel

- Adjust film thickness to recommended range. Consult your Diamond Vogel Technical Service Representative.
- Lower the electrostatic settings on the equipment.
- Some powder coatings are formulated and manufactured to tighter, more controlled particle size distribution allowing for a smoother film.

13. Color Contamination

- Clean feed and spray systems completely before color changes (cross contamination).
- Dedicated powder hoses (and feed hoppers) can reduce the chance of contamination.

14. Off Color Film

- Examine application procedures to determine if variations in film thickness are causing the problem.
- Evaluate time at peak metal temperature, to determine if the parts have been over cured.
- Check oven exhaust.
- If the powder is off color, please contact your Diamond Vogel Technical Service Representative.

15. High Gloss

- When applying a semi-gloss or flat coating and it appears that the gloss is too high after coming out of the oven, check oven settings and part temperatures. This is usually an indication of under cured powder.

16. Low Gloss

- Check oven and part temperatures to determine if the part has been over cured.
- Always make sure powder coatings are compatible before mixing.
- Check for microscopic pinholing or outgassing (see section 18).

17. Variations in Film Thickness

- Check application patterns and gun set-ups.
- Could be caused by surges in the powder flow (see section 8).
- Turbulence in the booth air flow.

18. Pinholing/Outgassing

- Usually caused by air or moisture being trapped in porous metal or castings.
- Pre-heat parts before applying powder, or bake at a slower rate.
- Use powder coatings that are formulated to be more forgiving for outgassing.

19. Edge Pull, Craters

- Poor surface preparation can cause voids and craters in a coating.
- Excessive phosphate residues on edges can create edge pull.
- Check dry-off oven for residual moisture on parts.
- Extremely smooth powder coatings may exhibit more edge pull due to the flow of the coating.
- Increase electrostatic settings for more edge coverage.

20. Poor Hardness and Abrasion Resistance

- Always know part temperatures and times to avoid under curing the coating. Either increase the oven temperature or extend the time in the oven.
- Determine Cure through the Solvent Rub Test.

21. Poor Corrosion Resistance

- Check your pretreatment system for cleaning effectiveness. Evaluate phosphate coating weights along with total dissolved solids levels in rinse tanks.
- Evaluate total film thickness to determine most effective level for the end environment.
- Always know peak metal temperatures and total time at that temperature to avoid under curing the coating.

22. Lack of Flexibility and Adhesion

- Usually caused by under curing.
- Check pretreatment system for cleaning effectiveness. Evaluate phosphate coating weights along with total dissolved solids level in rinse tank.
- Check for excessive total film thickness.

23. Color Shift in Metallics

- Changes in gun to part distance and electrostatics will change the orientation of the metal flake within the coating, causing color shift.
- Increasing the KV may darken color.
- Decreasing the distance may darken color.
- Increasing the distance may lighten color.
- Decreasing the KV may lighten color.
- Changes in the powder delivery rate and total film thickness will also affect color. Control both factors.
- Dry blended powders may stratify.
- Higher metallic concentrations can lead to short circuits in powder delivery system.
- Frequently purge the gun with air to maintain a clean tip.