



# IFS PUROPLAZ TROUBLESHOOTING

## Terms and definitions

Call: 866-437-2864

### **Back Ionization/kV rejection –**

Where an excessive build-up of charged powder particles limits further powder being deposited on the substrate and can reverse the electrical charge of the surface layer of powder particles. May also be referred to as Reverse Ionization, Electrostatic Rejection or Rebounding.

**Compatibility –** The capacity of powder coatings from either different sources or different compositions/formulations to be combined and applied so as to yield no visible or mechanical differences in the cured film or application properties.

**Corona Charge –** The process of inducing static electric charge on powder particles by passing the powder through an electrostatic field generated by a high voltage device.

**Crater –** Small round depressions in a coating film typically caused by incompatibility or contaminants. They may or may not expose the underlying surface.

### **Cross Hatch Adhesion –**

Tests the adhesion of cured coatings to a substrate. The test is performed by scribing a cross hatch pattern at specific intervals and pulling the area with tape.

**Cure End Point –** The point during/ following the cure schedule when powder coating film is determined to have developed specific properties.

**Cure Schedule –** The time/temperature relationship required to properly crosslink a thermosetting powder.

**Delivery –** The process of moving the powder coating through the application equipment to the end product.

**Dry Blending –** A powder coating manufacturing process in which materials are blended without melting.

### **Dry Film Thickness –**

Thickness of applied coating when dry.

**Edge Coverage –** The ability of a powder coating to flow over, build and adhere to sharp corners, angles and edges.

### **Faraday Cage Effect –**

The phenomenon by which charged particles are prevented from entering recessed areas due to the curvature of electric field lines to nearest ground.

**Impact Fusion –** When finely divided powders combine with other particles in the application equipment during the application process.

**Intercoat Adhesion –** The ability of a powder coating to adhere to a previously applied film.

**Melt Point –** Temperature at which finely divided powder will begin to melt and flow.

**Orange Peel –** An irregularity in the coating surface due to the inability of the wet film to level out. Similar in appearance to the skin of an orange but usually smooth to the touch.

**PMT –** Peak Metal Temperature.

**Reclaim –** The process of gathering and recycling non deposited powder. Powder that has been sprayed and then collected for re use or recycle.

**Recovery –** The process of removing non deposited powder from the air prior to recirculating the powder through the delivery system.

**SDS –** Safety Data Sheet.

**Sintering –** The tendency of some powders and powder coating materials to form into a mass during storage.

**Storage Stability –** The ability of powder coatings to maintain uniform physical and chemical properties under specified storage conditions.

**Thermoplastic –** Powder coating which will repeatedly melt when subjected to heat and solidify to a uniform film when cooled. Examples are Polyethylenes and Nylons.

**Thermosetting –** Powder coating designed to undergo an irreversible chemical change during the cure schedule. Examples are epoxies, polyesters and acrylics.

**Tribocharging –** Creation of a static electric charge on powder particles formed by friction against a non-conductive material.

### **Venturi (Metering Orifice) –**

A constructed throat in a powder pump used to determine velocities, by the measurement of differential pressures generated at the throat as powder passes through the tube.

**Virgin Powder –** Unsprayed powder as opposed to previously sprayed or reclaimed powder.

**VOC –** Volatile Organic Compound.

**Wrap –** A characteristic of powder coatings in electrostatic application to seek out and adhere to parts of the substrate not in direct line of sight of the delivery system end point.



## Common technical problems

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Issue	Cause	Remedy
<b>1 Poor impact resistance with relation to failure on Holiday spark testing</b>	1a Overheated	1a Run oven temperature profile to determine if recommended time at temperature is achieved; adjust oven temperature or adjust line speed or dwell time. Please see TDS
	1b Poor cleaning or pretreatment	1b Check pretreatment equipment and concentrations. Consult pretreatment supplier
	1c Change in substrate thickness or type	1c Check substrate with supplier
<b>2 Poor adhesion</b>	2a Underheated	2a Run oven temperature profile to determine if recommended time at temperature is achieved; increase oven temperature or adjust line speed. Please see TDS
	2b Poor cleaning or pretreatment	2b Check pretreatment equipment and concentrations. Consult pretreatment supplier
	2c Film too thick	2c Reduce film thickness by adjusting application equipment
	2d Change in substrate	2d Check substrate with supplier
	2e Contamination issues	2e Check for surface contaminants; make sure the equipment you use during coating application is properly clean from previously used powders
<b>3 Poor corrosion resistance</b>	3a Poor cleaning or pretreatment	3a Check pretreatment equipment and concentrations. Consult pretreatment supplier
	3b Oven set point too high	3b Run oven temperature profile to determine if recommended time at temperature is achieved; increase line speed
	3c Poor surface profile	3c Please check the TDS for recommended surface profile
<b>4 Poor abrasion resistance</b>	4a Oven setpoint too low / Poor surface finish	4a Run oven temperature profile to determine if recommended time at temperature is achieved; increase oven temperature or adjust line speed. Please see TDS
	4b Uneven coating thickness	4b Make sure that coating thickness across the tested part is consistent

Issue	Cause	Remedy
<b>1 Powder is blowing around escaping from the hopper</b>	1a Air pressure too high	1a Reduce the air pressure into the fluidizing bed
	1b Powder level too high	1b Remove excess powder from the hopper – the hopper should be 2/3 full when fluidized
	1c Blocked air membrane	1c Clean the membrane or replace it
	1d Powder too fine	1d Please contact IFS
<b>2 Insufficient fluidization in fluid bed</b>	2a Insufficient air pressure	2a Check the air supply; increase air volume; check the air line to be sure it is supplying a suitable volume of air
	2b Blocked/plugged membrane	2b Check the bottom of the fluidizing bed and clear blockages; if damaged or contaminated with oil or water replace with new membrane
	2c Powder has become compacted	2c Stir the compacted powder with a clean wooden stirring device and fluidize the powder with clean dry air (care must be taken not to damage the fluidizing membrane at the bottom of the hopper with the stirring device)
	2d Moisture into the powder	2d Follow remedy 2c to allow powder to dry during fluidization in the bed; contact IFS
<b>3 Large air holes being blown through the surface of the powder (Rat holes)</b>	3a Powder level is too low	3a Add more powder – the hopper should be 2/3 full when fluidized
	3b Packed or moist powder	3b Ensure sufficient supply of air volume; unplug by manually loosening and fluidizing powder by stirring with clean, dry instrument or clean, dry air; ensure the compressed air and application room are free of moisture or high humidity
	3c Damaged or plugged membrane	3c Check the membrane for clogged pores, cracks or holes and replace if necessary
	3d Poor particle size distribution in the fluidized bed	3d Please contact IFS
<b>4 Excess powder on top of the coated part</b>	4a Powder on top of the application has not melted and still in powder phase	4a Shake or blow excess powder from part
	4b Too much dwell time into the fluidized bed	4b Adjust the dip time into the fluidized bed
<b>5 Uneven coating thickness</b>	5a Metal application consists of parts that do not have the same thickness	5a Adjust part orientation to correct position to achieve even coating thickness; trials will be very helpful to find ideal process conditions; please see TDS.

Issue	Cause	Remedy
<b>1 Not enough powder being fed</b>	1a Powder is not fluidizing properly	1a Check the spray equipment hopper for any problems
	1b Blockage in the powder supply	1b Clean and check pick up tubes, pumps and hoses. Repair, clean or replace if necessary; check sieve screen for proper operation and tears. Fix/replace if necessary; ensure no foreign objects/materials in powder supply
	1c Kinks in the hose line	1c Remove kinks and replace if necessary
	1d Pump venturis are worn	1d Replace worn parts, implement proper maintenance procedure
	1e Not enough air pressure	1e Check air supply for blockages; check and adjust the air settings to pumps
	1f Humidity issues with the powder	1f Please contact IFS
<b>2 Static (tribo) charging</b>	2a Low humidity in the application room	2a Ensure humidity is controlled to required specification for your system
	2b Inadequate grounding of equipment	2b Ensure that all the application and recovery equipment has a good ground
	2c Humidity issues with the powder	2c Please contact IFS
<b>3 Poor charging, low film build, insufficient wrap, poor transfer efficiency</b>	3a Inadequate kV settings	3a Check voltage at electrode, cable and power supply; replace missing or broken electrodes; clean and remove build up from electrodes
	3b Poor grounding	3b Check ground from conveyor through hanger to part (recommended ground is less than 1 Megohm at 500 mv); clean and remove build-up of insulating materials (including powder) from conveyor, load bars and hangars
	3c Too much powder delivery	3c Reduce air pressure to allow the powder to charge properly and maintain a good gun to part distance
	3d Too little humidity in application room	3d Too little humidity can reduce the charge on powder particles (50%±10%); ensure humidity is controlled to the proper specification for your system
	3e Powder too fine / too coarse powder	3e Please contact IFS
	3f Spray Booth air velocity too high	3f Refer to the spray booth manual
<b>4 Back ionization/kV rejection – powder rebounds from the part</b>	4a kV settings – voltage too high	4a Reduce kVs (voltage) and check for adequate ground
	4b Spray distance too close	4b Recommended spray distance is approximately 8-12 inches away from your product, depending on your equipment settings and part configuration
	4c Poor grounding	4c Confirm all your equipment is properly grounded
	4d Humidity levels too low	4d Control/adjust humidity to proper specification
	4e Excess coating thickness	4e Reduce coating thickness by decreasing spray time and/or powder flow air pressure
	4f Powder too fine/coarse	4f Please contact IFS

Issue	Cause	Remedy
<b>5 Guns spitting, surging and inconsistent powder feed</b>	5a Not enough air pressure or volume	5a Check equipment specifications and ensure air supply lines are correct size; increase feed and/or atomizing air pressure
	5b Hoses kinked, crushed or too long	5b Replace worn hoses; ensure no sharp bends or excess hose runs; use the shortest hose runs possible and/or practical for manual and automatic guns
	5c Hoses, pumps, pick-up tubes or guns with impact fusion	5c Check and clean hoses, pumps, pick up tubes and guns; ensure compressed air supply is clean and dry; ensure humidity is set at correct specification for your system
	5d Powder too fine	5d Please contact IFS
	5e Powder not properly fluidizing	5e Check fluidizing hopper setting; adjust for slow simmer fluidization
<b>6 Poor spray pattern</b>	6a Gun parts worn beyond equipment supplier recommendations	6a Check and replace worn out nozzles, deflectors and electrode sleeves
	6b Hoses, pumps, pick-up tubes or guns clogged by impact fusion	6b Check and clean hoses, pumps, pick up tubes and guns every day or on every shift; ensure the compressed air supply is clean and dry; ensure humidity is at correct specification for your system
	6c Not enough powder feed or atomizing pressure	6c Adjust the feed and atomizing air pressure to the application equipment for a consistent spray pattern
<b>7 Poor powder thickness or coverage</b>	7a Electrostatic equipment not providing high enough kV	7a Ensure that the voltage is adequate with a voltage meter to properly charge the powder; check and replace missing or broken electrodes; clean electrodes to remove impact fusion; adjust the equipment positions to allow the spray patterns to better cover the parts
	7b Poor grounding	7b Ensure proper grounding; recommended ground is less than 1 Megohm at 500 mv
	7c Excessive powder delivery	7c Ensure adequate space between parts - reduce racking density or change rack design
	7d Air velocity too high for powder feed settings causing the powder to be blown past the part	7d Reduce air setting and/or move gun further back away from the part
	7e Too much moisture in the powder application area causing a disruption of the electrostatic charge to the powder particles	7e Control/adjust humidity to proper specification in the powder application area
<b>8 Powder Sagging</b>	8a Oven temperature too high	8a Reduce oven temperature and/or dwell time accordingly
	8b Excess coating thickness	8b Reduce coating thickness

Issue	Cause	Remedy
<b>1 Craters/ fisheyes</b>	1a Moisture/oil in air lines	1a Inspect airlines and ensure air is clean and dry; check filters and drain or install traps
	1b Contamination with incompatible materials	1b Make sure the gun, hopper and spray booth are completely cleaned and that the powder was stored correctly; check for and eliminate incompatible materials throughout the process e.g. silicones and lubricants
	1c Contamination with incompatible powder	1c Clean guns, hoses and hoppers thoroughly after each color change to eliminate cross contamination of different coatings; ensure parts are completely dry before entering spray booth; use virgin powder
	1d Poor cleaning or pretreatment	1d Check pretreatment equipment and concentrations; consult pretreatment supplier
	1e Overheating	1e Increase line speed or decrease oven temperature. Please see TDS
<b>2 Gloss variation</b>	2a Overheating	2a Increase line speed or decrease oven temperature. Please see TDS
	2b Contamination with incompatible powder	2b Clean guns, hoses and hoppers thoroughly after each color change to eliminate cross-contamination of different coatings; ensure parts are completely dry before entering spray booth; use virgin powder
<b>3 Poor color</b>	3a Overheating	3a Increase line speed or decrease oven temperature. Please see TDS
	3b Contamination with incompatible powder	3b Clean guns, hoses and hoppers thoroughly after each color change to eliminate cross-contamination of different coatings; ensure parts are completely dry before entering spray booth; use virgin powder
<b>4 Poor opacity</b>	4a Coating thickness too low	4a Increase coating thickness. Please see TDS for time and temperature settings
<b>5 Poor flow (orange peel effect)</b>	5a Coating thickness too high	5a Reduce coating thickness. See TDS
	5b Insufficient oven temperature (too low)	5b Increase oven temperature and/or decrease line speed
	5c Substrate heat-up time too short	5c Adjust oven temperature and/or oven dwell time; make sure that the part itself reaches the correct coating temperature for the correct time
	5d Coating thickness too thin	5d Increase coating thickness. Please see TDS

## Appearance issues (continued)

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Issue	Cause	Remedy
6 Powder Sagging	6a Coating thickness too high	6a Reduce coating thickness
	6b Oven temperature too high	6b Decrease oven temperature and/or increase line speed
7 Pin holing	7a Moisture in powder	7a Check for and eliminate moisture in powder
	7b Oven temperature too high or too low	7b Adjust oven temperature and/or adjust line speed
8 Outgassing	8a Substrate porosity/ poor substrate surface/oxidation	8a Check substrate for porosity and outgas 50°F above coating temperature; check surface for rust and remove if possible
	8b Poor cleaning and pretreatment	8b Check pretreatment equipment and concentrations; consult pretreatment supplier
9 Contamination: other colors in coating surface	9a Poor clean up between color changes or powder types	9a Clean feed and spray system; develop a changeover checklist to assure a proper color change is performed
10 Pin holes on a wire application at welded area	10a Coating thickness too low	10a Increase coating thickness to allow powder to cover welded area
	10b Coating temperature too low	10b Increase oven temperature to allow material to flow and cover wire welded area
11 Edge pull	11a Oven temperature too high	11a Reduce oven temperature
	11b Sharp edges	11b Please contact IFS

## Housekeeping

Issue	Cause	Remedy
1 Lumps or packed powder	1a Improper storage – temperature or humidity too high, or shelf life expired	1a Screen and sieve powder prior to spraying (20-30 mesh); add virgin powder in the fluidized bed, stir if you need to improve fluidization of powder; please check TDS or consult IFS

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