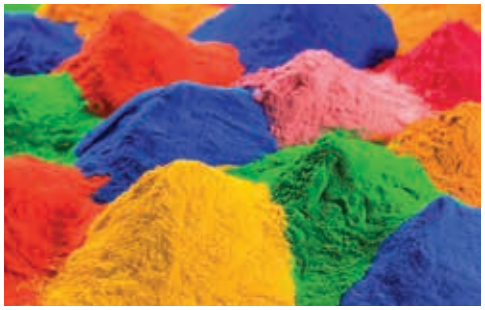
ifs coatings



IFS TROUBLESHOOTING GUIDE

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.

Cured film properties

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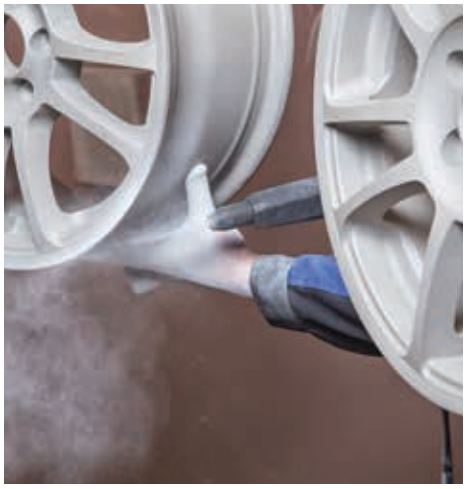
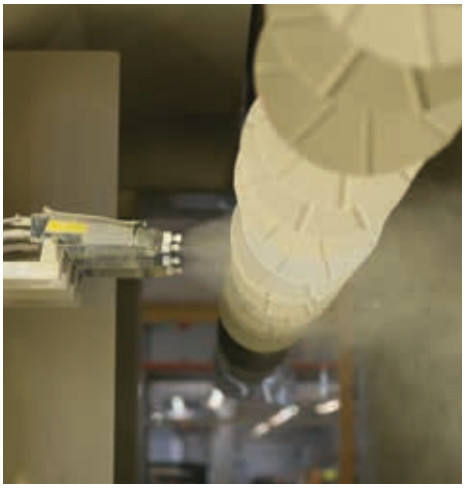
Issue	Cause	Remedy
1 Poor impact resistance or flexibility	1a Under-cured/over-cured	1a Run oven profile to determine if recommended time at temperature is achieved; amend oven temperature or amend line speed or dwell time
	1b Poor cleaning or pretreatment	1b Check pretreatment equipment and concentrations. Consult pretreatment supplier
	1c Film too thick	1c Reduce film thickness by adjusting application equipment
	1d Change in substrate thickness or type	1d Check substrate with supplier
2 Poor adhesion	2a Under-cured	2a Run oven profile to determine if recommended time at temperature is achieved; increase oven temperature or decrease line speed/increase dwell time
	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
3 Poor corrosion resistance	3a Poor cleaning or pretreatment	3a Check pretreatment equipment and concentrations. Consult pretreatment supplier
	3b Under-cured	3b Run oven profile to determine if recommended time at temperature is achieved; increase oven temperature or decrease line speed/increase dwell time
4 Poor pencil hardness; poor abrasion resistance	4a Under-cured	4a Run oven profile to determine if recommended time at temperature is achieved; increase oven temperature or decrease line speed/increase dwell time
5 Chipping	5a Cure schedule	5a Increase oven temperature and/or dwell time. Make sure that the object itself reaches the correct cure temperature for the correct time
	5b Film thickness	5b Reduce film thickness by decreasing spray time and/or air pressure
	5c Poor substrate	5c Ensure parts are properly cleaned and pretreatment system is in good working order





Hoses and pumps

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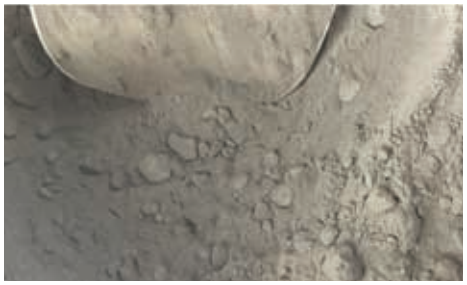
Issue	Cause	Remedy
1 Impact fusion	1a Build-up of powder due to inadequate maintenance	1a Clean and if necessary, replace worn parts; implement proper maintenance procedure
	1b Too much feed air pressure	1b Reduce air pressure setting on gun and transfer pumps
	1c Moisture in compressed air supply	1c Ensure the air supply is clean and dry
	1d High relative humidity in application area	1d Apply powder in controlled area with a humidity of 50% ± 10%
2 Not enough powder being fed	2a Powder is not fluidizing properly	2a Check the IFS fluidizing section
	2b Blockage in the powder supply	2b Clean and check pick up tubes, pumps and hoses. Replace if necessary; check sieve screen for proper operation and tears. Fix/replace if necessary; ensure no foreign objects/materials in powder supply
	2c Squashed hoses, or kinks in hose line	2c Replace squashed hoses; remove kinks and replace if necessary
	2d Pump ventures are worn	2d Replace worn parts, implement proper maintenance procedure
	2e Not enough air pressure	2e Check air supply for blockages; check and adjust the air settings to pumps
3 Static (tribo) charging	3a Low humidity in the application room	3a Ensure humidity is controlled to required specification for your system
	3b Inadequate grounding of equipment	3b Ensure that all the application and recovery equipment has a good ground
4 Surging, spitting or interrupted powder flow	4a Not enough volume or supply pressure of air	4a Check and ensure constant air supply
	4b Kinks in the powder hose lines	4b Remove kinks from hoses
	4c Pump venturi tubes, hoses or guns blocked with impact fusion	4c Ensure tubes, hoses and guns properly cleaned; ensure air supply is free of oil or moisture
	4d Too much humidity in the powder area	4d Ensure proper humidity levels in the application area



Powder Feed – Fluidizing issues

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Issue	Cause	Remedy
1 Powder is blowing around and out of the hopper	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 Powder too fine (mix of virgin & reclaim powder)	1c Adjust the mix of virgin to reclaim powder
	1d Powder too fine (only virgin powder)	1d Contact IFS Coatings
	1e Blocked hopper or poor venting	1e Clean the hopper & vent and if necessary increase the vent size
2 No air percolating through the surface of the powder	2a Insufficient air pressure	2a Check the air supply; increase the amount of air; check the airline to be sure it is supplying a suitable volume of air
	2b Plugged membrane	2b Check the fluidizing membrane and if damaged or contaminated with oil or water replace with new membrane
	2c Blocked membrane	2c Check the bottom of the fluidizing bed and clear of blockages
	2d Powder too fine	2d Adjust the mix of virgin to reclaim powder (mix of virgin & reclaim powder should be 50% to 50%)
	2e Powder has become compacted	2e Loosen 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)
3 Large air holes being blown through the surface of the powder	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 Unplug by manually loosening and fluidizing powder and stir 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 plugged pores, cracks or holes and replace as necessary
4 Fine and coarse powder particles separating into different layers	4a Powder level too high	4a Remove powder until the hopper is around 2/3 full when fluidized
	4b Powder too fine (mix of virgin & reclaim powder)	4b Adjust the mix of virgin to reclaim powder
	4c Powder to fine (only virgin powder)	4c Contact IFS

Application

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Issue	Cause	Remedy
1 Poor charging, low film build, insufficient wrap	1a Inadequate kV settings	1a Check voltage at electrode, cable and power supply; replace missing or broken electrodes; clean and remove build up from electrodes
	1b Poor grounding	1b Check ground from conveyor through hanger to part (maximum ground is less than 1 Megohm at 500 volts); clean and remove build-up of insulating materials (including powder) from conveyor, load bars and hangar
	1c Too much powder delivery	1c Reduce air pressure to allow the powder to charge properly and maintain a good gun to part distance
	1d Too much/little humidity in application room	1d Too much humidity can reduce the charge on powder particles. Ensure humidity is controlled to the proper specification for your system
	1e Powder too fine (virgin/reclaim mix)	1e Maintain a proper virgin/reclaim mix
	1f Powder too fine (virgin powder)	1f Contact IFS
2 Poor penetration (powder not penetrating into faraday cage areas e.g. corners and recesses)	2a Poor voltage (too high or too low)	2a Adjust voltage and Micro Amps so powder can build evenly especially at edges and corners
	2b Powder/air velocity too high	2b Control air pressure to prevent powder from being blow out of recessed areas
	2c Poor grounding	2c Ensure adequate grounding (1 Megohm or less resistance to ground at 500 volts)
	2d Inadequate application technique and/or poor automatic gun placement	2d Ensure that gun to part and gun to gun distances are suitably for proper powder charging
	2e Poor spray pattern	2e Use different nozzle or deflector (check with equipment manufacturer)
	2f Powder too fine (virgin/reclaim mix)	2f Adjust virgin/reclaim mix
	2g Powder too fine (virgin)	2g Contact IFS
	2h Too little powder delivery	2h Increase rate of powder flow if needed
3 Back ionization/ kV rejection – powder rebounds from the part	3a kV settings – voltage too high	3a Reduce kVs (voltage) and check for adequate ground
	3b Spray distance too close	3b Recommended spray distance is approximately 8-12 inches away from your product, depending on your equipment settings and part configuration
	3c Poor grounding	3c Confirm all your equipment is properly grounded
	3d Humidity levels too low	3d Control/adjust humidity to proper specification
	3e Powder too fine (virgin/reclaim mix)	3e Adjust virgin/reclaim mix
	3f Powder too fine (virgin)	3f Contact IFS
	3g Excess film thickness	3g Reduce film thickness by decreasing spray time and/or powder flow air pressure
4 Guns spitting, surging and inconsistent powder feed	4a Not enough air pressure or volume	4a Check equipment specifications and ensure air supply lines are correct size; increase feed and/or atomizing air pressure

Application (continued) — Call: 866-437-2864

Issue	Cause	Remedy
4 Guns spitting, surging and inconsistent powder feed	4b Hoses kinked, crushed or too long	4b 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
	4c Hoses, pumps, pick up tubes or guns with impact fusion	4c 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
	4d Powder too fine (virgin/reclaim mix)	4d Adjust virgin/reclaim mix
	4e Powder too fine (virgin)	4e Contact IFS
	4f Powder not properly fluidizing	4f See fluidizing section
5 Poor spray pattern	5a Gun parts worn beyond equipment suppliers recommendations	5a Check and replace worn out nozzles, deflectors and electrode sleeves
	5b Blockage caused by impact fusion	5b Clean and remove any impact fusion from parts; implement standard maintenance procedure
	5c Hoses, pumps, pick up tubes or guns clogged by impact fusion	5c 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
	5d Not enough powder feed or atomizing pressure	5d Adjust the feed and atomizing air pressure to the application equipment for a consistent spray pattern
6 Poor powder thickness or coverage	6a Electrostatic equipment not providing high enough kV	6a 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; readjust the equipment positions to allow the spray patterns to better cover the parts
	6b Poor grounding	6b Ensure good grounding
	6c Excessive powder delivery	6c Ensure adequate space between parts - reduce racking density or change rack design
	6d Excessive air velocity of powder feed settings causing the powder to be blown past the part	6d Reduce air setting and/or move gun further back away from the part
	6e Powder attracted to adjacent parts	6e Ensure adequate space between parts - reduce racking density or change rack design
	6f Too much moisture in the powder application area causing a disruption of the electrostatic charge to the powder particles	6f Control/adjust humidity to proper specification in the powder application area
7 Powder sagging	7a Incoming part temperature too hot	7a Reduce oven temperature and/or time accordingly
	7b Excess film thickness	7b Adjust equipment accordingly
8 Foaming of the surface	8a IR-oven: temperature too high	8a Increase line speed, or reduce the temperature

Appearance

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Issue	Cause	Remedy
1 Craters/ fisheyes, pull away, voids	1a Oil or moisture in air lines	1a Inspect airlines and ensure air is clean and dry; check filters and drain or install traps; check oil absorption unit for excessive signs of oil
	1b Contamination with incompatible materials	1b Make sure the gun, hopper and spray booth is 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
2 Gloss difference	2a Over/under cured	2a Run oven profile to determine if recommended time at temperature is achieved; increase/ decrease oven temperature or increase/decrease line speed or dwell time
	2b Contamination with incompatible powder	2b Clean guns, hoses and hoppers; clean hangars; ensure parts are completely dry before entering spray booth; use virgin powder
	2c Outgassing or micro pinholing	2c Check and eliminate moisture in compressed air or powder; check substrate for porosity; film thickness too high
3 Poor color	3a Over/under cured	3a Run oven profile to determine if recommended time at temperature is achieved; increase/ decrease oven temperature or increase/decrease line speed or dwell time
	3b Inadequate oven exhaust	3b Check for obstruction in exhaust stacks; ensure proper fan operation
	3c Poor natural gas quality	3c Check with gas supplier for the amount of sulfur in the natural gas supply
4 Poor opacity	4a Film thickness too low	4a Increase film thickness – use higher voltage, longer spray time or denser powder cloud
5 Poor flow (too much orange peel)	5a Film thickness too low	5a Increase film thickness – use higher voltage, longer spray time or denser powder cloud
	5b Back ionization/kV rejection	5b See application section
	5c Oven temperature too high	5c Reduce oven temperature and/or increase line speed/decrease dwell time
	5d Substrate heat up time	5d Adjust oven temperature and/or time. Make sure that the object itself reaches the correct cure temperature for the correct time.
	5e Improper storage powder storage	5e Make sure that the powder has been stored in the proper environment. Storage in high temperature or humidity can excessively age powder

Appearance (continued) — Call: 866-437-2864

Issue	Cause	Remedy
6 Sags	6a Film thickness too high	6a Decrease film thickness – use lower voltage, shorter spray time or less dense powder cloud
	6b Oven temperature too low	6b Increase oven temperature and/or decrease line speed/increase dwell time
7 Pin holing	7a Moisture in compressed air or powder	7a Check for and eliminate moisture in compressed air or powder
	7b Film thickness too high	7b Decrease film thickness – use lower voltage, shorter spray time or less dense powder cloud
	7c Oven temperature too high	7c Reduce oven temperature and/or increase line speed/decrease dwell time
	7d Substrate porosity	7d Check substrate for porosity
8 Contamination: other colors in cured film	8a Poor clean up between color changes or powder types	8a Clean feed and spray system; develop a changeover checklist to assure a proper color change is performed
9 Inconsistent film thickness	9a Inadequate application pattern	9a Check application procedures
	9b Booth air flow unbalanced and causing uneven spray pattern	9b Consult your equipment supplier
	9c Inconsistent powder flow	9c Check for surging, spitting or interrupted powder flow

Housekeeping

Issue	Cause	Remedy
1 Powder drifting through spray booth (inadequate air flow through booth)	1a Blinding of filter cartridges	1a Clean or replace filters; check pulse air
	1b Final filters blocked	1b Check for and eliminate moisture/oil in air supply
2 Lumps or packed powder	2a Improper storage – temperature or humidity too high, or shelf life expired	2a Screen and sieve powder prior to spraying; consult IFS

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