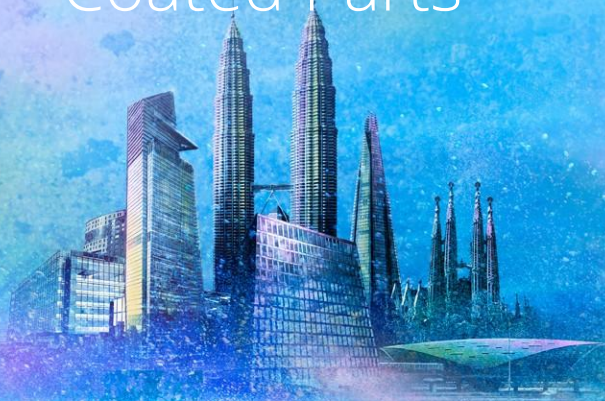


Interpon[®]
POWDER COATINGS

 **Architectural**

Guidance Note 10

Application, Quality Control of Metallic and
Effect Powder Coatings & Handling of
Coated Parts



AkzoNobel

Overview

This document is intended to be used as guide for the applicator, to highlight which of the various application parameters might influence appearance of finishes coated with Interpon D metallic and effect powder coatings and how to stick to quality control procedures. The guideline should be used to understand optimum application settings and handling/transportation to optimize end result. We expect all applicators to review the handling and transportation procedures and ensure they are consistently followed.

Guideline has been divided into 4 sections and starts with:

- Quality Control on application line
- Handling and transportation of coated parts

Then, it specifically focuses on:

- Application of metallic and effect coatings – recommended application settings, line and equipment considerations, trouble-shooting.
- Application considerations for Interpon D architectural collections.

The Interpon D range includes metallic and special effect powder coatings. Some of these are represented in the Collection Futura, RAL Metallics, Brilliance, Anodic, Stone-Effect, Terracotta and Precis Ultra-Matt Colour Cards. Metallic coatings are chosen primarily for their stunning visual appeal and optical depth particularly when compared against standard solid colour products.

Depending on the visual aspect of the coating or type of metallic pigments used, the appearance of effect finishes may show subtle variations. In some instances, 'flip-flop' pigments might be used to further enhance these variations when viewed at different orientations and under varying light conditions. This is considered normal for such powder coatings, and adds to their attractiveness as a living coating, not a dull, lifeless colour.

- The metallic effect comes from either metal or mica platelets. Metallic colours can therefore look different depending on the angle of the light reflecting on the platelets, and their orientation.
- The orientation of these plates can be influenced both by the spraying conditions/equipment, by the melting process in the oven (where different melt viscosities are achieved on different geometry parts), and by the film thickness of the coating.
- Light from different sources may affect colour and effect.

All AkzoNobel metallic and effect coatings are application stabilized. The process of stabilization may differ depending on type of effect, colour and can be either by dry blending or bonding process.

It is important to mention that whilst strict quality control procedures are in place to maintain batch-to-standard and batch-to-batch consistency, due to their nature, the reproducibility during production of metallic and effect powders is more difficult than that for solid colours. **It is highly recommended on any individual project one batch of powder should be used, and if possible, the entire coating job should always be applied by the same coating company on the same coating line.** For further information regarding long term / large scale projects please refer to your local AkzoNobel representative for further guidance.

1. Quality Control on Application Line

1.1 Reference panel

Applicators should always have a powder coated reference panel provided by AkzoNobel. Reference panel could be one of the following: laboratory reference panel, production batch panel provided by QC of AkzoNobel. If there is color card available, color chip on color card can be used as reference.

For each project with metallic&effect powder coatings used, applicator should apply the powder on applicators' coating line onto a test panel to keep it as master standard for the project. Visual check between AkzoNobel reference panel and Master panel of applicator coating line must be done.

It is advised to validate the master standard with end client. Depending on the scope of project, this Master panel should be applied and signed off before production commences, ideally at prototyping stage.

AkzoNobel reference panel and master standard panel should be used during each production run to ensure consistency in colour, finish and appearance. AkzoNobel recommends retaining panels from each production run to evaluate consistency of the application. It is advised to retain all production sample panels until project is complete and signed off. For each application, in case there is a previous production run, validation of the production run sample against a previous production run is recommended.

It is highly recommended to use single batch of powder coatings for the entire project. If it is not possible, sticking guidance to manage appearance consistency in line with recommendations provided in 7.1 to 7.3 is significant. In case of notable visual difference, applicator should inform primary AkzoNobel contact or AkzoNobel Technical Service.

AkzoNobel do not recommend the use of single angle spectrophotometers to measure colour of metallic effect finishes.

1.2 Application considerations

It is important to check consistency in appearance in line with Qualicoat 'Quality Control of the Finished Products' recommendations with same frequency summarized as per below. Coated parts throughout the entire production run; at the start, middle and end must be checked.

Table 1 Appearance test frequency with different lot sizes

Appearance test

The appearance shall be controlled on pieces as specified below:

Lot size (*)	Number of pieces (random selection)	Acceptance limit for rejected pieces
1 - 10	All	0
11 - 200	10	0
201 - 300	15	0
301 - 500	20	0
501 - 800	30	0
801 - 1'300	40	0
1'301 - 3'200	55	0
3'201 - 8'000	75	0
8'001 - 22'000	115	0
22'001 - 110'000	150	0

* lot: a customer's complete order in one colour or the part of the order that has already been coated

Applicator should control and validate the visual appearance and colour of powder coated pieces and parts with respect to the reference panel and master standard panel defined in reference panel in 5.1. Appearance evaluation should be done with a comparable film thickness for both panels and monitored throughout the entire production run. If there is reclaim in metallic and effect finishes, monitoring appearance throughout production run becomes more critical.

During application process, applicator should evaluate the consistency of colour and appearance between pieces with & without powder reclaiming.

Appearance should always be evaluated on the primary surface. When evaluating appearance under artificial lighting, all appearance checks should be made under suitable lighting conditions, without shadow or light interference.

When evaluating appearance on exterior building projects, it is recommended to carry out appearance checks at outside under natural lighting conditions.

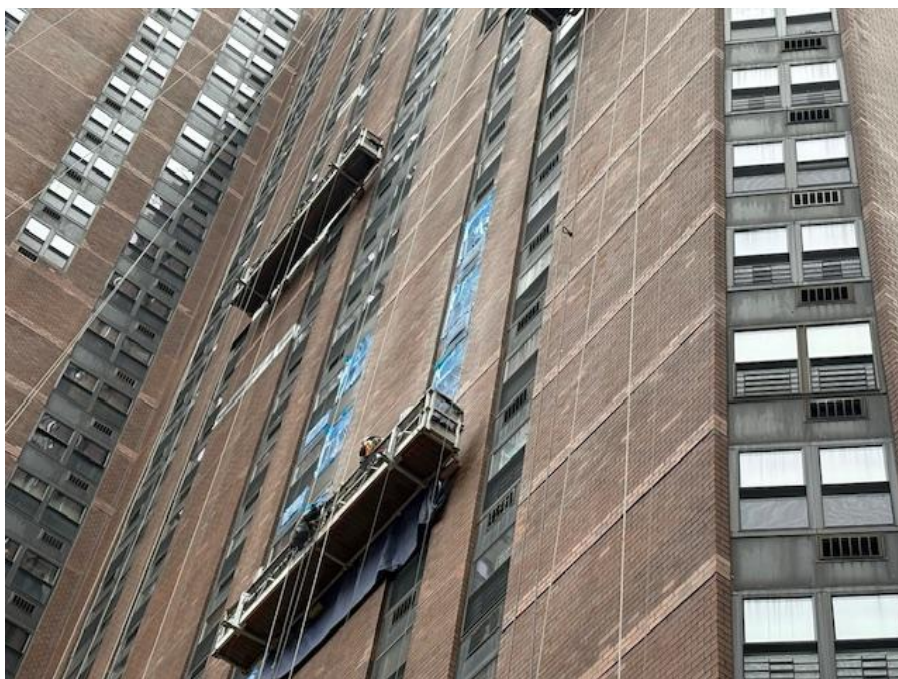
2. Considerations for transportation and handling of coated pieces:

2.1. Handling & Protection Before Installation

- Use protective films (low-tack tapes) until the last possible moment. Keep profiles wrapped or protected with low-tack tape/film, foam separators, or edge guards to avoid scratches (during handling, installation and transportation).
- Low-density polyethylene (LDPE) film with a pressure-sensitive acrylic adhesive.
- It will prevent scratches, scuffs, and dirt on the coated surface. It has a thickness of 40–80 µm, 3 to 6 months outdoor stability (UV resistance) and it is the most critical protection layer.
- Insert foam spacers (EPE), paper or nylon interleaving in sheets or sleeves between profiles for wrapping and bundle protection. It absorbs shocks and vibration during transport, it will prevent profile-to-profile abrasion.
- Wrap bundle in bubble wrap or foam-laminated film. Typically used for long-distance shipping/export packing. Provides extra cushioning against impact.
- Stretch film (LDPE stretch wrap) holds bundles tightly together. It protects from dust, moisture, and handling damage. Often applied after foam wrapping. When extra protection for moisture is needed, especially for long shipments, desiccant bags inside the wrapping may be used.
- Avoid storing parts wrapped with plastic film/foils in hot and/or humid environment to produce micro-climate that trigger strong blanching reaction of film.
- Use soft gloves to avoid fingerprints, abrasion or contamination.
- Avoid storing parts wrapped with plastic film/foils in hot and/or humid environment to produce micro-climate that trigger strong blanching reaction of film.
- Avoid dragging profiles on hard surfaces and lift instead of sliding to prevent coating damage.
- For Mechanical separation and structural protection the following are typically used:
 - o Cardboard edge protectors / honeycomb board. They prevent corner crushing and strap marks and distributes the pressure from strapping bands.
 - o Plastic or foam spacers. Keep profiles separated inside bundles and avoids rubbing of sharp edges.
 - o Timber or plastic pallets/crates. They ensure stable stacking and proper forklift handling.
- Secure with PET/PP straps. Secure bundles to pallets.

2.2 Avoiding Mechanical Damage During Installation

- On the construction site and during construction, the coated aluminium should be protected from damage caused by abrasion and construction materials, such as paint, mortar, cleaning chemicals etc.
- If such materials have been in contact with the coated surface, they should be cleaned immediately before they have dried. Failure to remove these materials at this early stage will require the use of aggressive cleaning materials and techniques that may result in damage to the coated surface
- Use non-marring tools (rubber mallets, nylon shims, plastic wedges)
- Prevent direct contact with sharp objects (clamps, chisels, metal edges)
- Handle coated parts with soft gloves to avoid fingerprints, abrasion or contamination.
- Maintain adequate clearances to prevent coated surfaces from rubbing during thermal expansion
- Keep protected the coated parts from scaffolding appendices when mobile scaffolding is used like in attached photo. The mar force exerts by those appendices cannot withstand by organic coating film and will result in visible abrasions.



2.3 Post-Installation Protection

- If construction continues around installed profiles: Reapply temporary protection (low-tack tape, protective film)
- Protect from concrete, plaster, welding spatter or grinding dust
- Avoid prolonged adhesive contact

2.4 Protection of Coated Surfaces During Scaffolding Activities

Protecting coated surfaces during scaffolding work is essential to maintain coating performance, prevent early corrosion, and avoid costly rework.

We suggest following guidance:

- Maintain protective measures for the duration of scaffolding installation and use.
- Train personnel on handling practices that avoid damage to coated surfaces.

- Identify potential risks of contact or abrasion and instruct immediate corrective actions.
- Install protective wrapping on coated surfaces before any scaffold tube or fitting is brought into position.
- Ensure the materials used:
 - o Are **non-abrasive, clean**, and free of contaminants.
 - o Provide sufficient cushioning to prevent mechanical impact.
 - o Are securely fastened to prevent slippage during scaffolding activities.
 - o Direct metal-to-coating contact is **strictly prohibited**.
 - o Maintain a physical separation layer (e.g., soft pads, sleeves, timber battens) where proximity cannot be avoided.
- Maintain protective materials in place until scaffolding is fully removed.
- Inspect the condition of padding throughout modifications and repair or replace as necessary.
- Remove scaffold elements in a controlled manner, avoiding contact with coated surfaces.
- Conduct daily visual inspections to:
 - Verify protective materials are intact and correctly positioned.
 - Identify any signs of coating damage (abrasion, impact marks, chipping).
 - Any observed damage shall be reported immediately to QA/QC and documented.
 - Repairs shall be carried out in accordance with the approved coating repair procedure.

3. Application

3.1. Application Parameters

Application parameters and process conditions influence colour and appearance of the finish. Therefore, it is necessary to maintain consistent application parameters on any given project once they are established. The following table summarizes parameters which should be monitored to achieve optimum and consistent results.

Whilst all of the application settings can be controlled, it is highly recommended to produce a reference panel or piece before starting the first full production run (using representative application parameters expected for the final coating). Reference samples should be sent to the contractor for approval before work commences, and these should show the likely range of colour variation to be expected. Colour and appearance should be checked continuously during the project. Once application conditions giving the desired effect are set, they should not be changed for the duration of application. Use of reference panel or pieces becomes increasingly significant especially if the project is coated across multiple production runs, coated parts are likely to be fitted together after application or multiple batches of powders are used.

Table 2 Recommended Application Settings

Powder Feed	All metallic powder coatings should be applied using a fluidised hopper. Best practice would be to fluidise the full box of material prior to delivering to the feed-hopper. Some powder coating feed systems utilise a mini fluidising hopper which is fed directly from the box, it is recommended in this instance to fluidise or at least aerate the full box of special effect powder prior to feeding to mini hopper. The use of direct box feed equipment may not consistently reproduce the required finish. This aspect becomes critical if the powder to be applied is to be reclaimed.	
Equipment Settings	Gun Type	Electrostatic Corona. Tribo guns are not recommended.
	Nozzle	Flat fan/Slot nozzle. Deflector cones should be avoided.
	Feed air	Set to achieve required film thickness as per product TDS
	Dilution air	Set to eliminate surging at gun tip. Too high dilution air may induce striping / patchy appearance.
	Voltage	Ideal range: 50-80kV
	Current	Ideal range: 8 μ A to 20 μ A
	Gun distance	Maintain a min. spray distance of 25cm. Optimum should be to set the guns 25cm – 40cm from the surface to be coated.
	Reciprocator	Must be correctly configured to line speed to avoid 'Zig-Zagging' 'W' effect
	Iron collectors	Should not be used
	Reclaim	See section 3
Important considerations	Large panels or lengths of extrusion which have a large visible area	Application via automatic application equipment to ensure a consistent finish
	Large flat substrates	Applying with increased gun to work piece distance can be beneficial.
		Transportation / total air should be set as to avoid surging / spitting. Setting too high can increase the likelihood of striping, particularly if gun to work piece distance is less than 25cm. Transportation / total air should be set in balance with gun to work piece distance. Increased gun to work piece distance may require increased transportation / total air.

If manual application is required e.g., when powder coating complex shapes, touching-in missed areas etc., it is advised (if possible) to use the same manual operator and to use similar settings kV / μ A to the automatic guns. It is important to maintain an even gun distance from the part to minimise edge build-up and back ionization if the gun is held too close. A good spray technique is critical, avoid figure of eight motion or inconsistent technique. Any manual application should take place prior to auto application.

The optimum line set-up must be developed in a pre-trial phase and then applied to the full production scale up. Always record and maintain the equipment parameters throughout the initial production run and all subsequent runs for the same contract.

For recommended curing conditions always refer to the Technical Data Sheet.

3.2 Line and Equipment Considerations

One of the most important considerations is the correct and efficient earthing of the coating line, the object to be coated, and all equipment used. The conveyor, jigs/hangers, oven, booth, guns, and all ancillary equipment must be well earthed, all jigs/hangers should be clean. A good metal to metal contact is vital for efficient coating and to avoid static discharge.

It is not recommended to use Tribo guns for the application of metallic powder coatings. Although metallic coatings can be applied effectively at the beginning of a run, metallic powders tend to coat the inside of the gun reducing charge effectiveness which may result in poor application and appearance variations.

The orientation of components during coating can also produce visual differences in the finish. i.e., vertically hung versus horizontally hung. Care should also be taken to hang parts in the same orientation they are to be installed.

3.3 Reclaimed Powder

When using metallic or effect powders it is not always possible to reclaim the powder. Ability to reclaim depends on manufacturing process of metallic powders.

Dry-blended metallic powders should be sprayed to waste. Reclaim process can induce pigment separation from basecoat which can result in a dramatic inconsistency in appearance. Dry-blended metallics can be more prone to picture framing effect on edges and poor penetration into recessed areas.

Bonded powder coatings can often be recycled. However, best practise, particularly where precise appearance control is required would be to spray to waste (Suggested for Collection Anodic and Precis Ultra-Matt) . This is of particular importance when coating large projects across multiple production runs. If choosing to reclaim, powder amount should be carefully controlled and ideally reclaim is automated. It is often recommended that virgin to reclaim powder ratio should not exceed 80:20. Percentage of reclaim is highly affected by the type of shape being coated. For example, coating of large flat panels will generate low levels of reclaim but when coating mesh panel or small section extrusion, reclaim percentage will be relatively high. Reclaim percentage is also affected by the efficiency of the application and reclaim system; mono cyclone versus twin or multi cyclone versus cartridge recovery. If the reclaim system to be used is of cartridge design, please refer to your local AkzoNobel representative for further guidance.

In case metallic and effect coatings contain high levels of pigment where a major influence on overall appearance is under consideration, then even certain bonded metallics should still be sprayed to waste. Whilst reclaiming of bonded powder coatings is possible, extra care should always be taken to ensure appearance consistency is maintained. It is best practice to keep the hopper well charged with virgin powder and to control reclaim at all times. To determine whether a metallic or effect coating is dry-blended or bonded, it is advised to contact your local AkzoNobel representative to seek full clarification.

If applicator uses recycled powder, it is important to validate appearance of coated test pieces using both virgin and mixed powder. If recycled powder level fluctuates a lot, i.e. when coating varying component type during a single run, this could potentially lead to colour inconsistency.

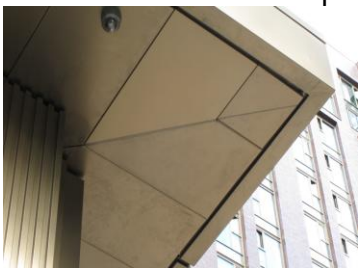
3.4 Applicator Considerations

It is the responsibility of applicator to determine each project size and total project duration. If project size or duration requires more than one batch of powder, it is advised to communicate with their local AkzoNobel representative to discuss batch management

(ensuring sufficient powder stock for the entire project) and any additional controls. In certain instances, it may be recommended to use one batch per phase, floor etc. If multiple batches are used when coating metallic or effect projects, the applicator must compare appearance against reference panels or parts. Careful consideration should also be given to how coated parts are to be assembled during fabrication. Appearance variations are likely to be more pronounced if parts from multiple production runs or batches are placed together.

3.5 Trouble Shooting

Table 3. Trouble shooting during application.

Problem	Potential Cause	Solution
Spits on coated parts, dry powder appearance	Metallic pigment build-up in the application equipment	-Apply using increased powder transportation/total air pressure -If fitted to application gun, check if rinse air is working -Set voltage to 50-100kV
Poor deposition (powder falling from surface)	Too high voltage (metallic pigment restricts charging in powder cloud)	-Set charging voltage between 50-100kV -Check current limiter (μ A) on gun is not set too low. -Set current to between 8 μ A to 20 μ A
Patchy appearance 	-Incorrect nozzle fit -Powder fed from vibrating box feed -Gun to substrate distance is too close -Uneven mix of powder and metallic particles	-Ensure gun is fitted with a flat nozzle -Feed powder always from a fluidized hopper system -Maintain min. spray distance where possible (25-40 cm) -Ensure all powder from box is emptied into hopper
Variation in appearance of finished film on different parts 	-Variation in equipment settings -Imbalance of powder added to system	-Maintain original settings throughout production -If manual application must be used (i.e for complex shapes, non-panel work etc.), where possible let the same operator to complete the job and use gentle spraying, avoiding a figure of eight motion -Ensure all powder from box is emptied into hopper
Differing aspect between production parts and standard panel 	-Incorrect film thickness -Imbalance of powder added to the system (virgin to reclaim ratio)	-Ensure film thickness is within recommended tolerances - Ensure all powder from box is emptied into the hopper.

4. Application Considerations for architectural collections

4.1 Interpon D2015 Précis Ultra Matt

Interpon D2015 Précis Ultra Matt series are super durable weather resistant polyester powder coatings, compared to solid non-metallic powder coatings may place increased demands on application processing.

This section helps users with the optimum processing of Précis Ultra Matt powder coatings.

General

Interpon D2015 Précis Ultra Matt powder coatings have increased charge acceptance properties when compared with solid non-metallic powder coatings, as a result of these properties transfer efficiency is excellent which can lead to increased DFT and in some instances undesirable back ionisation.

Interpon D2015 Précis Ultra Matt powder coatings should be preferably applied without recovery. The amount of powder needed for the coating of the entire order should be determined in advance and a certain reserve planned in order to be able to coat the entire order with one powder batch.

Application

Powder coatings of the Interpon D2015 Précis Ultra Matt series should be applied with corona systems with negative polarity.

Since the processing of Précis Ultra Matt powders is more critical than that of solid colours, it makes sense to determine the optimum process parameters such as high voltage, feed air, additional air, gun to workpiece distance etc. on the coating line in preliminary tests. This recommendation is of particular importance when powder coating complex parts / extrusions or where deep recesses are present. These parameters should then be maintained during subsequent application runs.

Processing Recommendations

1. Use guns with flat jet nozzles and air-flushed electrodes. Blow guns, hoses and injectors regularly in the direction of flow.
2. If possible, perform the complete coating job in one powder coating run, especially for parts that are installed/combined together.
3. Use one powder coating batch per coating order, even if it consists of partial orders.
4. All metallic powder coatings should be applied using a fluidised hopper.
5. There should be minimal changes to the application parameters (high voltage, feed air, additional air, etc.) within a coating job.
6. Pay attention to a uniform layer thickness distribution (sinus diagram).
7. Back ionisation effects should be avoided by taking appropriate measures.
8. Ensure good grounding of the coating line, particularly parts. Clean hooks, jigs should be used at all times.
9. The suitability of application parameters should be determined in preliminary tests. Good results could be achieved with the following settings:

Table 4 Recommended Application Settings

Powder Feed	Feeding	Recommended fluidized bed
Equipment Settings	Gun Type	Electrostatic Corona.
	Nozzle	Flat jet / slot nozzle
	Iron ring Ion collector	without
	Electrode rinsing air	0.2 – 0.3 Nm ³ /h
	High Voltage	Ideal range: 55-60kV
	Current limit	5 to 10μA
	Powder output	Adjust to achieve required DFT
	Reclaim	Preferably spray to waste
	Gun/object distance	25 – 40cm
	Target layer thickness	60 - 110 μm

Curing

Different cure profiles are to be avoided.

Try to avoid curing thick and thin gauge parts together.

The specified stoving conditions (object temperatures and holding times) of the technical product data sheet should be observed.

Co-applicable Documents

Technical data sheets for the product line Interpon D2015 Précis Ultra Matt.

4.2 Interpon D2525 Stone-Effect and Terracotta

Powder coatings of the Interpon D2525 Stone-Effect and Terracotta series are highly weather-resistant polyester powder coatings and, compared to uni-powder coatings, place far greater demands on processing. This section helps users with the flawless processing of Stone-Effect and Terracotta powder coatings.

General

It should be noted that the cured powder coating surface can lead to an uneven visual impression when using different spray elements as well as the processing of different powder coating lots of a powder coating. When applying these powder coatings, color, gloss or aspect differences can occur depending on the system. Therefore, we generally recommend an appropriate entrance inspection as well as a continuous examination accompanying the production. The special processing parameters can lead to additional expenses. The coating with Stone-effect/Terracotta powders can therefore not be calculated analogously to the coating with uni-tones. Stone-Effect/ Terracotta powder coatings are basically to be processed without recovery. The amount of powder needed for the coating of the entire order must be determined in advance and a certain reserve planned in order to be able to coat the entire order with a powder batch.

Application

Powder coatings of the Interpon D2525 Stone-Effect and Terracotta series can be processed with corona systems with negative polarity. An application with positive polarity (corona or tribo) creates a different look and is not recommended. Since the processing of Stone-effect/Terracotta powders is more critical than that of solid colors, it makes sense to determine the optimum system parameters such as high voltage, dosage, distance spray gun / substrate, etc. on the coating system in preliminary tests. These parameters are then to be maintained later in the series coating.

Processing Recommendations

1. Use guns with flat jet nozzles and air-flushed electrodes. Blow guns, hoses and injectors regularly in the direction of flow.
2. Perform the complete coating job in a powder coating line, especially for parts that are installed/combined together.
3. Use of a powder coating batch for a coating order, even if it consists of partial orders.
4. No change in the system parameters (high voltage, conveying air, metering, etc.) within a coating job.
5. Always precoat for difficult parts, never recoating (cloud formation!)
6. Pay attention to a uniform layer thickness distribution (track diagram).
7. Rewind effects should be avoided by taking appropriate measures.
8. Pay attention to the careful grounding of the parts.
9. We generally recommend coating only on one side.
10. In the case of two-sided application, an aspect difference in the edge area ("picture frame effect") may occur. This must be checked by appropriate preliminary tests and, if necessary, released by the end customer.
11. In the case of parts to be coated on both sides, the main light side must always be coated last. The parts should be hung up in such a way as to exclude any encroachment on the main visual side. The powder guns should be located opposite each other in automatic systems.
12. The application to so-called "scooping parts" or geometrically complex components must be checked by preliminary tests and, if necessary, released by the end customer.
13. The suitability of the application device and the application parameters are to be determined in preliminary tests. Good results could be achieved with the following settings:

Table 5 Recommended Application Settings

Equipment Settings	Pistol Type	Gema OptiFlex
	Pistol mouthpiece	Flat jet/slot nozzle
	Ion collector	Without
	Electrode rinsing air	0.2 Nm ³ /h
	High Voltage	80 - 100 kV
	Current limit	50μA
	Powder output	100 – 120g/min and gun
	Total air	4.5 Nm ³ /h
	Reclaim	Preferably spray to waste
	Gun/object distance	30 cm
	Target layer thickness	80 - 110 μm

Branding

If direct gas-fired dryers are used for the burn-in, we recommend pre-drying input test sheets in the production dryer. Different heating rates are to be avoided. Do not burn thick and thin-walled parts together. The specified stoving conditions (object temperatures and holding times) of the technical product data sheet must be observed.

Co-Applicable Documents

Technical data sheets for the product line Interpon D2525 Stone-Effect and Interpon D2525 Terracotta.

4.3 Interpon D Brilliance

The recommendations presented in this section are to be intended only for guidance for to implement the optimum line set-up for applying Interpon D Brilliance powders, including Interpon D1036 Matt, Interpon D2525 Matt, Interpon D1010 Matt and Interpon D2015 Matt Brilliance colors. The optimum line set-up must be found out in pre-trial phase and then applied in full scale production. Considering that transfer efficiency of metallic powder it is strongly affected by climate conditions of environment and powder storage (temperature and relative humidity) it is recommended to evaluate the starting line set-up conditions through a small pre-trial test every time a new full-scale production or a new powder batch is initiated. Interpon D Brilliance are metallic bonded powders according to Akzo Nobel bonding technology, if customer already use such quality powders it is recommendable to maintain the same line set-up conditions as starting point.

Recommendations for substrate preparation and line set-up

Aluminum components should receive a full multi-stage chromate conversion coating or a suitable chrome-free pre-treatment to clean and condition the substrate. Detailed advice should be sought from the pre-treatment supplier.

Galvanized steel components require surface preparation by either multi-stage pre-treatment using either zinc phosphate or chromate conversion or controlled sweep blasting. Depending on the type of galvanising, degassing or use of anti-bubbling additives may be required - follow the procedural advice of the pre-treatment supplier.

Cast and mild steel components require surface preparation by multi-stage pre-treatment using zinc phosphate (strongly recommended). For outdoor it is strongly recommended to use an anti-corrosive primer

For recommended curing conditions always refer to Interpon D Brilliance Technical Data Sheet.

Table 6 Recommended Application Settings

Equipment Settings	Gun Type	Electrostatic Corona
	Nozzle	Flat jet spray nozzle,
	Powder air	Manual application: Set Feed Air and Total Air to achieve even spray pattern. Important to apply using even spray pattern. Automatic line application air settings must be set up considering the film build and component geometry in relation to synchronism and gun voltage/current applied. It is advisable to choose a setting with Feed Air pressure as low as possible to reduce the likelihood of impact fusion in Venturi pumps. It is recommended to have the Total Air on high level to keep the powder cloud as de agglomerated as possible. If the automatic line is provided with tip-gun cleansing air, it is recommendable to be minimum 0.5 bar to avoid the formation of any agglomeration of gun-tip.
	Hopper	The use of direct box feed equipment may not reproduce fully the finish of colour standard. To ensure powder homogeneity, empty the boxes totally into the tray or feed hopper. Keep always over 50% powder volume of hopper.
	Voltage	Ideal range: 50-70kV
	Current	Ideal range: 5µA to 50µA
	Gun/object distance	Automated line: it must be set up considering the optimum synchronism between line speed, reciprocator stroke speed and film thickness build to be achieved in relation to component geometry. Best results seen with minimum of 250mm on automated lines Manual application: it is recommended to start with a distance of 200-250 mm to be possibly adjusted to achieve the desired film thickness build and even lay down.*
	Film thickness	Recommended range: 70 - 100 µm Film thickness <70µm should be avoided for to maintain a consistent colour through the work-piece surface Film thickness > 120µm should be avoided in order not to have undesired degassing, assembly fitting phenomena and decrease in film flexibility
	Reclaim	Unused powder can be recovered and recycled by using the most common equipment subject to normal controls on ratios of recycled-to-virgin powder. In any circumstances the recycled-to-virgin ratio should not exceed 1/5 (no more than 20% of recycled powder in the hopper)

*Gun settings will vary from customer to customer so these recommendations should be used for start-up guidance only.

Recommendations to avoid application issues

To prevent application issues like spitting, hose clogging, metal pigments agglomeration and impact fusion it is recommended to put in place the following best practice actions:

- Blow the hoses every 4 hours (twice per shift).
- Clean inside of each gun every 8 hours (every shift).
- At application start up blow clean the deflectors (gun tip) after 5-10min to remove the possible metal accumulation; repeat the operation if the deflectors do not stabilize clean. If the gun is provided with supplementary air to keep clean the gun diffuser: keep that air at maximum.
- In choosing the line setting up, always prefer the ones with conveying air pressures as low as possible in order to avoid impact fusion issue into the Venturi pumps.

Sealant choice & assessment

For the choice of the right sealant, it is strongly recommended to carry out adhesion tests in phase of pre-trial to choose the most suitable one before to go on full scale production. The sealants should be applied in fully accordance with the written recommendations and procedures of manufacturers. It is recommended for evaluation process to refer to following specification as well: ASTM C1184, C920-05, C794-93.

AkzoNobel Powder Coatings Issue 6, February 2026

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