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ELECTROSTATIC POWDER PAINT

Labella powder paint

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Manufacture of powder coating :

Raw material pre-mixing:

All the raw materials used in powder coatings are in the solid phase when mixed together . The polymer and the other ingredients such as pigments , fillers , cross linkers etc are weighed accurately into a mixing v essel. The contents are then blended together to produce a homogeneous mixture.

Milling or grinding :

The chips are then ground to achieve a particle size distribution suitable for the application process eg electrostatic spray , fluid bed dipping . For this a pin-disc or hammer mill is employed . In modern mills an internal classifier is used to limit the maximum particle size, oversized particles being continuously fed back to the mill.

Sieving:

This is the final operation in the process , irrespective of the method used to produce the powder.

This operationis used to remove any oversize particles which may have passed through the mill and to achieve a finely tuned particle size distribution.

Extrusion:

The pre-mx is then fed into the extruder, the barrel of which is maintained at an exact predetermined temperature. The barrel temperature is set so that the polymer is only just liquefied.Too high a temperature will give a low melt viscosity , low shear and poor pigment dispersion which in turn will not produce coatings with the desired performance

The feed rate on the hopper and the speed of the extruder screw are then balanced so that the screw is kept fully loaded. By careful adjustment of these three parameters , conditions of high shear and therefore intimate mixing are maintained within the extruder . The molten extrudate passes between cooling rollers and emerges as a thin sheet of approx . 1 mm thickness which is then broken up into chips of about 10-20mm.

Powder storage:

After final sieving , the powder is stored in tightly closed containers in a dry place to prevent possible contaminationor possible moisture pick-up. For long term storage powder should be maintained at as low a temperature as possible, preferably below 25 oC . Powders should be kept away from moving parts as frictional heat may cause the powder to fuse and possibly cure within the container.

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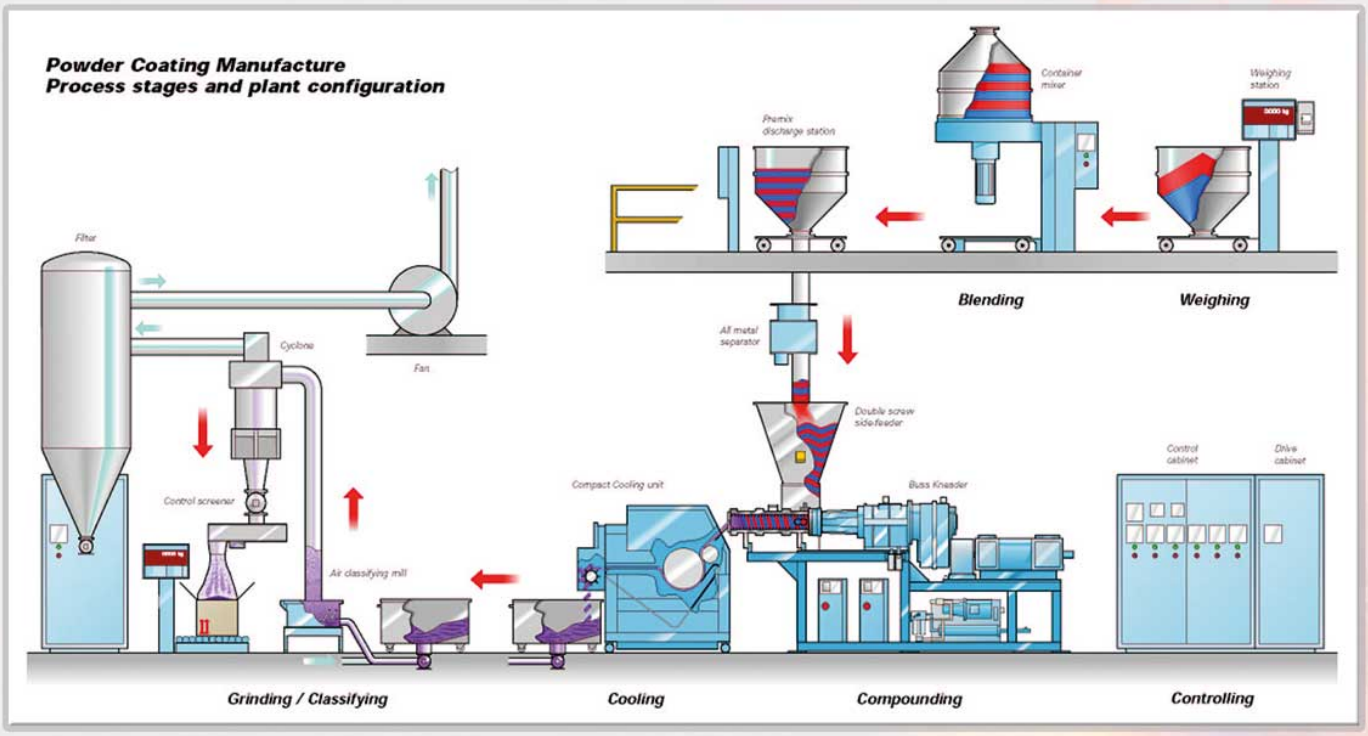
Powder Coating Manufacture
Process Stages and Plant Conguration



Powder Coating Manufacturing precess
Powder coatings typically contain:

- Binders (resins, hardeners)
- Additives
- Pigments
- Filler

Powder Coatings are manufactured in three steps;

1- Raw material mixing: All chemicals of the formulation are weighed and pre-mixed with the mixer during a known time until homogeneous mixture is obtained.

2- Extrusion: In the extruding process , the blend is melted and dispersed . After cooling rollers and belt steps, the material is broken into small chips.

3-Grinding in a fine powder : Those small chips are grinded at appropriate intervals (particle size distribution) for different applications. When an optimum particle size is obtained, the powder is packaged which is ready for use.

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Powder Coating Manufacture
Process Stages and Plant Conguration

Powder coatings are solvent - free paints, primarily applied to metal and other conductive surfaces. It comes as a solid material in the box . It is applied to the substrate by either electrostatic spray or fluid bed dipping .

After application it is then baked at an elevated temperature (between 110 - 200 °C , 225-400°F). At such prescribed temperature the powder melts, flows then reacts to form a solid coating.

Powder coatings have developed and expanded within the coatings industry since their first development in the 1960's into the innovative force we know today.

Global environmental concerns have resulted in legislation encouraging companies to find greener coatings solutions.

Our products powder coatings contain no Volatile Organic Compounds (VOC) and no toxic heavy metals such as lead or chromium (VI). Continuous innovation has led to an evolution in important parameters like ease of application, quality of finish and cost efficiency.

At we are proud of our powder coatings reputation. Our reputation is getting stronger with continuous development and innovation . Our powder coatings are used to decorate , protect and preserve thousands of products of products in the consumer space and small to big industries . Many of our products are used on internationally recognized brands.

These are trusted by our customers to brighten , protect and preserve their buildings, offices, factories and products.

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About Powder Coatings

Safe, clean, economical and eco-friendly Powder coatings are:

- Solvent-free
- Reduced risk of fire
- Lead-free
- Ease of waste disposal
- No hazardous materials used during clean up
- No Volatile Organic Compounds (VOC)
- Contain no toxic heavy metals such as lead or chromium (VI)
- No paint sludge from a spray booth
- High Application Efficiency; recyclable, up to 99% usage, overspray can be reused
- Improved productivity
- One coat system, simple process
- Can build high film thicknesses easily, up to 150 microns with one coat
- No costly removal and reprocessing of solvents
- Highly durable
- Low carbon footprint

In conclusion, our Powder Coatings:

- Give excellent performance
- Meet the wide range of global coatings standards
- Can offer significant cost benefits compared to liquid paints
- Are safe and sustainable

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Benefits of powder coatings

Powder means no solvent wastage hence simply more eco-friendly. Powder coatings contain no VOCs or solvents.

There is no costly wastage of solvents which at application viscosity , constitutes up to 70 % of conventional liquid paints . These solvents , which volatilize during application and stoving are usually not recoverable . Legislation introduced in various parts of the world has prohibited their discharge into the atmosphere . This means in some cases , after - burners must be installed to eliminate the solvents with an added increase in costs.

Powder means no effluent disposal problems

Water wash spray booth are often used with liquid paint systems. The overspray is often emulsi¦ed in the water. This in some cases is put directly into a drain or allowed to settle out in sludge tanks.Powders do not give rise to this kind of problems and the associated extra waste disposal costs.

Powder helps reduce air pollution

Any over sprayed powder is recoverable . This is great news in reducing waste, and no powder need to escape into the atmosphere.

Powder helps reduce the health hazard to operators

As powders do not contain solvent there is a marked reduction in nose, mouth and throat irritation. Any liquid paint which comes into contact with an operator's skin needs to be washed of with solvent, and then removed by emulsifying with soap in hot water . Sometimes even special industrial hand cleaners must be used In general powder does not cause skin irritation though in rare cases individuals may react to certain types of powder. The powder can be removed from the skin easily by washing with warm water.

Powder offers a reduction in fire risk

There are no solvents in powder coatings this reduces the associated ire risk . It therefore gives cost savings on statutory safety features in your plant and reduces insurance premiums. You also won't be subject to lammable liquids regulations.

Processing time is reduced

Powder processing times are generally shorter than those used for liquid paints -there is no solvent so no lash of period is required. Instead, the powder coated articles can pass directly into the oven. This gives substantial saving in space and time.

Reduced energy requirements compared to solvent based stoving paints

The oven the air turnover rate is significantly reduced as there is no build up of potentially explosive solvent which must be removed. This means less heating of air and less energy consumption and lower cost.

Reduced energy requirements compared to aqueous based paints

Aqueous or water based paints also contain organic solvents.Therefore, the energy saving above associated with the removal of VOC from the coating and air in the oven can be achieved. Additionally, with aqueous based paints there is a need to control the temperature and humidity of the application area precisely which is an added cost compared to powder coatings.

Powder coatings are ready to use

You can use our powders immediately . There's no need to mix them with anything else like solvents or catalysts.Great news if you're looking to save time on the shop floor.

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Benefits of powder coatings

Powder offers superior film properties

With solvent based systems , the solvent balance must be carefully adjusted to the polymeric type, application and curing conditions, as many Film defects can be traced directly to incorrect solvent balance . With powders no such condition exists and in general superior Film properties such as adhesion and corrosion resistance are obtained with powders, compared to polymers deposited from liquid systems.

Damaged parts are easily rectified

Damaged or poorly coated areas can be easily rectified before baking by simply blowing off the powder and recoating.

Air conditioning requirements are reduced – more cost savings

The air extraction in a powder spray booth is a lot less than for solvent based paints. Great news if you're looking for economies in ventilation and the consequential heating of work areas. As less warm air needs to be replaced in workshops, less dust is attracted and there is less air-draught for the operators to contend with.

95% powder utilization

With powder, material loss can be kept to less than 5%. Any powder overspray can be recovered and the recovered powder can be blended with virgin powder to provide up to 95% utilization. Almost all of what is in the powder box finishes on the coated article. Many liquid coatings contain a high level of volatile content which is lost during the painting process meaning perhaps only 50% of what is in the tin actually ends up on the workpiece.

With powder, you get a controlled film thickness

You can achieve a controlled more uniform and, if necessary, higher ¦lm thickness in one application with powder than with conventional liquid paint system. There are also some superb thin film thickness powders available with Interpon.

A huge range of coatings and effects are available

Whether it's decorative, functional or both powder coatings o¦er a viable solution. An enormous color palette,matt,satin,gloss, metallic, textures, soft touch – you name it. And the functional properties range from anti-bacterial to corrosion protection and easy cleaning.

Operator training is minimal with powders

Operators require much less training to apply powders than solvent based systems.

Powder is cleaner to use

Applying powder is much cleaner than applying wet paint. A spray booth can be cleaned down quickly and easily. Any spillages of powder outside the booth can be removed with an industrial vacuum cleaner.

A powder application plant is less costly

A powder application plant, either manual or automatic, is extremely simple to operate and less costly than a multicoat liquid system.

Powder is flexible – non-metallic surfaces can be coated

Is not just metal that benefits form powder coatings.Surfaces such as glass and certain thermosetting moldings which can withstand the curing temperatures involved can be powder coated. The scope of materials which can be used is ever increasing as advancements in lower bake technologies are made.

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Types Of Powder Coating

- **Epoxy:**

The formula contains epoxy type resin and suitable hardening agent. It is used when resistance against chemicals is needed. Particularly the fuel tanks can be given as an example. Such kind of coatings has less strength against temperature and light.

- **Epoxy-Polyester:**

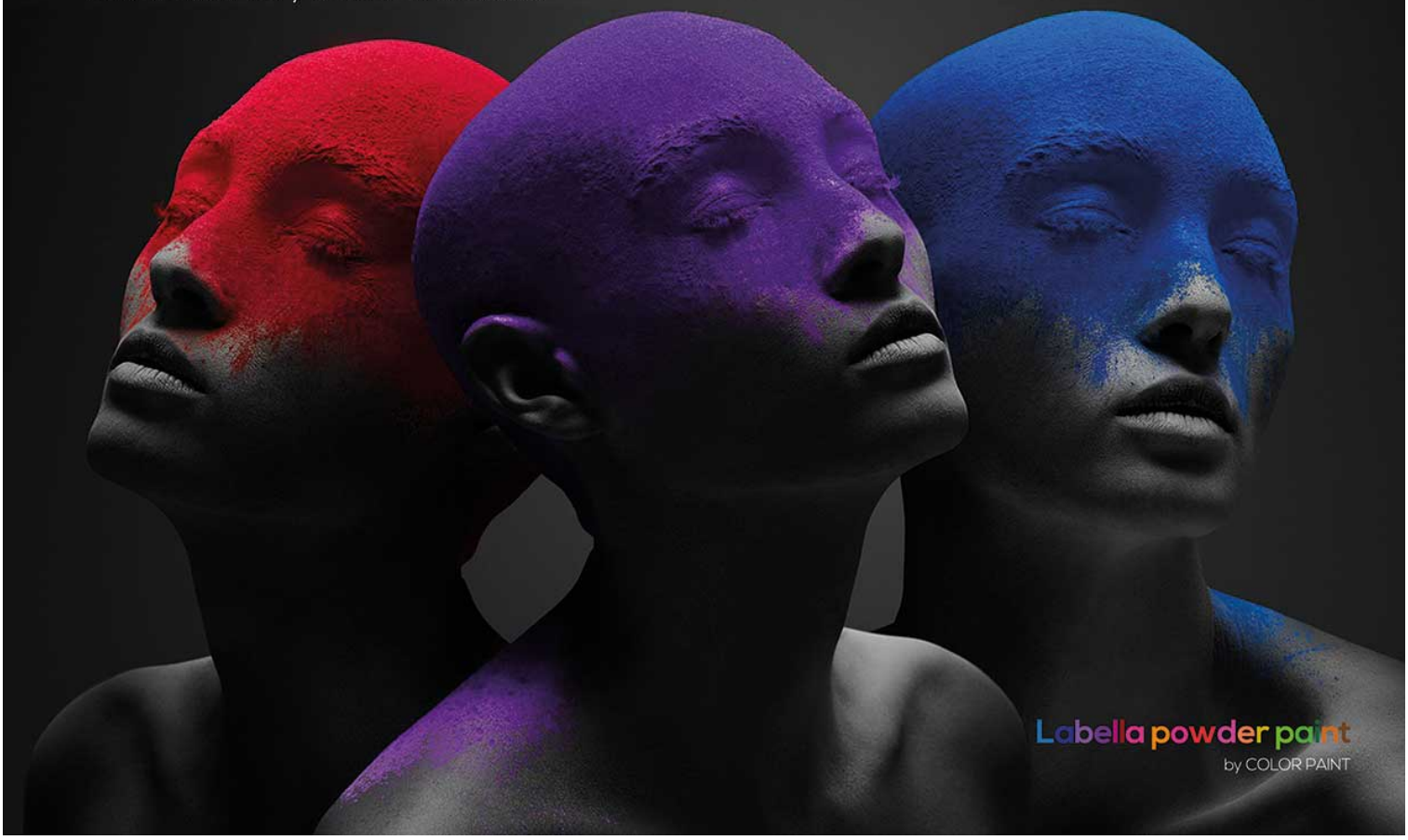
It contains epoxy and polyester resin . It is the type of coating developed for providing physical and chemical strength properties together . It is particularly an inevitable solution for the white appliances industry. In addition to this , lighting ¦xtures, metal furniture, hospital equipment, armatures, and shower cabins can be coated with such kind of coatings. Although it is stronger than epoxy type coatings in terms of temperature and light resistance, it has less resistance than the outdoor polyester coatings. Its cost is lower than the other types of coatings.

- **Polyester/PRIMID:**

It is another exterior wall product made by using polyester resin and Primid hardening agent. It is developed as an alternative to Polyester / TGIC product . As is known , products containing TGIC have to receive some certain labeling marks according to the European Union norms, while Primid products do not contain any marking.They generally have the same characteristics with TGIC products. They are used for coating outdoor materials, particularly in the aluminum pro¦le industry. These are Qualicoat certi¦ed products.

- **Polyurethane:**

It is made by hardening isocyanate with polyester resin. There are two types , including indoor and outdoor. The only handicap during the past years was the smoke it emitted during the curing process. The smoke problem has been solved in last versions of this kind of coatings, which allow very smooth surfaces.



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Tests for Powder Coating

- *Surface Smoothness Test*
- *Gloss Test*
- *Color Test*
- *Film Thickness Test*
- *Impact Resistance Test*
- *Flexibility Test*
- *Hardness Test*
- *Density Test*
- *Moisture and Salt Test*
- *Adhesion Test*
- *Conical Bend Test*
- *Particle Size Analysis*
- *Accelerated Weathering Test*
- *Opasity Test*
- *Viscosity Test*
- *Acid Resistance Test*
- *Detergent Resistance Test*
- *Yellowing Test*
- *Gell Time Test*
- *Scratch Test*
- *Stone Impact Test*
- *Cold Stone Impact Test*
- *DSC test*

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Research & Development
HUMIDITY TEST

It is used to evaluate the humidity resistance of coated material in constant varying condensation water environments . In accordance with the ISO 6270 standard, materials are tested according to the customer's request CH (constant humidity humidification environment) , AHT (changing humidity and air temperature humidification environment) and AT (changing ambient air temperature humidification environment) selection.

HOLIDAY DETECTOR

It is a device that measures dielectric strength according to coating thickness of powder coatings. It is used to determine the maximum voltage that the powder coated conductive material such as metal can protect its insulating property. Premature corrosion of a substrate is usually due to a coating failure. A major cause is the presence of flaws in the finished coating , collectively referred to as porosity.Holiday test is used to detect holes, known as holidays or discontinuities , in a coating. Holiday testing allows the detection of even smallest coating flaws invisible to the naked eye.

ASH OVEN

This is ash oven that can be operate at 25°C to 1100°C temperature range. The resistance of high t emperature resistant powder coating products such as EE56, SL54 is tested with this oven.

HYDRAULIC AHDESION TESTER

The Hydraulic Adhesion Tester is one of the most accurate and versatile adhesion testers currently available. It measures the adhesion bond strength of applied coatings with ease , and precision. The adhesion is measured by the tensile pull on a Dolly glued to the coating surface. The force is applied through the centre of the Dolly by a hydraulically loaded pin . This ensures an exactly central point-loading of the force.

MACHU TEST

This is an accelerated corrosion test for Qualicoat, and commonly used in Eurpe . Salt spray testing takes typically 500 and 1000 hours. This can slow down the development work in R&D laboratories. The machu test offers a possibility to shorten 1000 hours of salt spray testing into a 48 hour evaluation period. Since the test conditions are quite severe , the Machu test results are slightly inferior on average to the corresponding salt spray results; i.e. if it passes the Machu test, it will most likely pass salt spray. Tests are made according to ASTM B117 standard in our R&D Department.

CLIMATIC CABINET

It is a device developed to regulate real climate conditions by controlling cycles such as temperature and humidity. Time and humidity programming can be performed to observe the behavior of the powder coating placed in constant temperature, under conditions of without humidity or relative humidity up to 98% and temperature range of -40°C to 150°C, where stability, artificial aging, storage and shelf life tests can easily be performed

ELECTRICAL CONDUCTIVITY MEASUREMENT EN 61340

Normally all the powder coatings are insulative. But as we also produce conductive and antistatic (ESD : Electro static dessipative) products upon request. Surface resistivity of coated panels can be measured in Ohm /sq to determine its conductive properties.

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Research & Development

• DSC

By differential scanning calorimetry (DSC) analysis can be advantageously obtained by using DSC analysis versus alternative methods(gel time , solvent cure test, storage stability etc.) Information such as the glass transition temperature (Tg) and the cured film temperature(Cured Tg)values of the powder coating and the stock stability of the powder coating , the softening property of cured film when subjected to temperature, the kinetic properties of the coating as well as information such as cured paint film is sufficiently or excessively cured or inadequately cured are obtained.

RHEOMETER

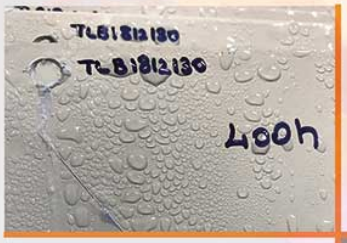
During curing conditions powder coating particles first melt and hence wet the substrate . As temperature and time increase , due to thermosetting reaction gelation occurs. The change in viscoelastic behaviour due to temperature during curing can be evaluated with a rheometer. In this way, the melting and gelation temperatures of the coating,as well as the viscosity values during curing, can be calculated.

SALT SPRAY TEST

This is a laboratory test that measures corrosion resistance of organic coated metal material. Both pretreatment and coating properties affect the results. Although no definite one to one match can be made be ween the end result of the test and the real time duration of use , according to ISO 12944 , salt spray test can give a directional correlation with the results of the corrosion classes from C2 to C5 . The material is exposed to 5% Sodium Chloride (NaCl) solution at 35 ° C continuously in salt water test, whereas in real life it is exposed to different ratios of humidity, temperature and ionic interactions . Tests are made according to ISO 9227 standard in our R&D Department.

GRADIENT OVEN

The gradient-oven is a test apparatus for evaluating the baking behavior of powder coatings . The gradient oven consists of 45 heating elements each micro-processor controlled.A linear gradient or step gradient can be programmed to precisely determine the cure temperature . The ramp up temperature rate and bake time can also be programmed to similuate customer application conditions,and give us information on how coated film behave at different curing conditions such as chemical resistance , impact resistance , overbake yellowing etc.



RAMAN SPECTROSCOPY

The Raman effect allows fast , non - destructive chemical analysis of solids , powders , liquids , and gases - today , Raman spectroscopy is used in many varied fields . In powder coatings raman is used to determine causes of surface defects on coated films , lead pigment amount in powder coatings and for special materials.

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Problems & Solutions
Problems with Powder Application

Poor fluidization in feeding box

Causes	Solutions
Air is too low or high	**Check the setting parameters**
Teflon membrane in the bottom of box is clogged	**Clean the membrane from the dust and increase the air pressure to start fluidization**
Amount of fine in particle distribution	**Reduce the amount of recycled powder added to virgin powder and contact with supplier**
Dusting out of feeding box	
Powder is too fine	**Reduce the amount of recycled powder added to virgin powder and contact with supplier**
Air pressure too high	**Reduce air pressure**
Bad particle size distribution (excess of fine)	**Contact with supplier**
Agglomeration of particles	
Humidity in the powder due to incorrect storage	**The powder must be dry and stored at the suitable temperature,(less than 25°C and approximately 50 – 60% relative humidity)** **The powder can be used after sieving**
Back Ionization	
If the powder coating is too thick	**Reducing the high-voltage however, this results in a reduction of the powder transfer rate**
Over-Voltage (very high)	**Reduce the voltage**
Gun is too close to the metal	**Increase distance between gun and metal surface**
Insufficient grounding	**Check the all connections**
Poor Charging- Not enough powder build on	
Insufficient grounding	**Clean hangers regularly-Check the grounding resistance periodically by a megaohm meter**
Powder is too fine	**Too much reclaim is added to virgin powder**
Moisture in air	**Check air supply**
Too fast powder flow rate	**Check the set value and reduce the flow rate**
Air pressure is too high	**Check air setting parameters and arrange the distance between gun and metal (increase)**
Poor Penetration to the corners and edgesmetal	
Poor grouding	**Clean hangers regularly-Check the resistance to ground periodically by a megaohm meter**
Not suitable the gun system to the shape of the metal to be coatted	**Contact with supplier and change the type of powder coat whose formulation and partcle size distribution adjusted for the area to be painted and for the gun system**
Incorrect distance between the spray gun and the object	**Adjust gun position so powder cloud will reach to the area and cover**

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Problems & Solutions
Problems with Powder Application / SURFACE DEFECT

Changes in gloss

Causes	Solutions
Contamination reduce the gloss	**Clean application equipments and check the powder**
Not enough curing time and temperature increase the gloss	**Check the product data sheet for curing conditions.**
Problems with formulation	**Check with supplier**
Film thickness too high or too low	**Check the product data sheet for optimum fim thickness**

Orange Peel / Poor Flow

Voltage is too high	**Reduce voltage and arrange appropriate conditions for the type of powder**
Film thickness is too low	**Arrange appropriate value for air pressure and voltage and then adjust the optimum thickness written in product data sheet**
Not enough curing time and temperature	**Check the product data sheet for curing conditions.**
Curing is too slow or too fast	**Check curing cycle and temperature**
Unsuitable particle size distribution (too coarse)	**Contact with supplier**

Pinholing

Humidity of powder is too high	**Check storage facilities optimum conditions of less than 25°C and approximately 50 – 60% relative humidity**
Problems with metal surface	**For example aluminum could have porosity which cause outgassing**
Problems with pretreatment	**The treatment process may be leaving some impurities on the surface, the washing step should be checked**
Formulation and application errors	**Contact with supplier and film is too thick which prevent outgassing**

Cratering on Surface

Insufficient pretreatment-remaining oil and rust	**Check pretreatment steps**
Back ionization	**Increase distance between gun and metal surface and also choose the suitable powder type (tribo or corona) for the gun system**
Problems with metal surface	**Aluminum could have porosity which cause outgassing**
Contamination with the powder from the other manufacturer	**Cleaning application equipments and working area more carefully**
Contamination with silicone	**Do not use silicone in working area**

Changes in Colour and Yellowing

Changes in film thickness (too thin or too thick)	**Adjust the optimum thickness written in product data sheet**
Over curing of powder causes yellowing	**Check the product data sheet for curing conditions**
Problems with the formulation (low coverage)	**Contact your powder supplier**

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Problems & Solutions
Problems with Powder Application / Problems with Mechanical and Chemical Properties

Poor impact resistance

Causes	Solutions
Not enough curing time and temperature	Check the product data sheet for curing conditions
Film thickness is to high	Check the setting parametres for the gun to reduce the thickness
Insufficient pretreatment	Check pretreatment equipments and chemicals

Poor corrosion and chemical resistance

Insufficient pretreatment	Check pretreatment equipments and chemicals
Not enough curing time and temperature	Check the product data sheet for curing conditions
Selecting the wrong powder	Check with powder manufacturer if the powder coat is suitable for atmospheric conditions or not
Variations in metal composition	Check the quality of your metal composition. It can make effect on the adhesion and corrosion resistant
Film thickness is too low	Appling too thin film will cause corrosion problems because of not proper protection
Film thickness is too high	Appling thicker film will reduce flexibility and impact resistance which will cause corrosion problems after a certain time

Poor hardness / abrasion resistance

Not enough curing time and temperature	Check the product data sheet for curing conditions.
Unsuitable packaging and transportation	Hard knocks should be avoided. Materials should be used for protection, such as foam when transportation
Problems with formulation	Check with supplier

Poor Adhesion

Contamination	Poor pretreatment, check the process
Poor grounding	Clean the hangers and Check the resistance to ground periodically by a megaohm meter
Not enough curing time and temperature	Check the product data sheet for curing conditions
Particle size distribution	Contact with manufacturer

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Transfer Efficiency (TE)

When powder coatings are applied to a substrate using an electrostatic spray gun some of the powder sprayed adhere to the part and some does not. Transfer Efficiency (TE) is defined as the ratio between the amount of powder actually deposited on the part intended to be coated, and the total amount of powder sprayed. It is given as a percentage, as like 100 % . Increasing transfer efficiency will reduce the amount of powder over-sprayed and the amount of reclaim generated. High transfer efficiency means lower cost, high productivity and high quality.

There are several important issues that affect the TE:

Gun voltage/current: The optimum voltage range is between 30 to 100 kV. Higher voltages generally produce much amount of reclaim. And the optimum current draw for a good transfer efficiency is 10 to 20 microamper, µA which provide good deposition and penetration into Faraday areas.

Powder Flow Rate (air adjustment): Too much air velocity reduces transfer efficiency and complicatest the application into corners .Small powder particles are directed by air toward the part and adhere to the surface by electrostatic attraction. If the powder is moved too fast, it will hits quickly to the surface and falls. Because the speed of the compressed air is a greater force than the electrostatic attraction. So, the lower the air flow means the higher transfer efficiency, more consistent film thickness , less orange peel and less abrasion to wear parts.

Gun Positioning: Gun to part distance is important for the transfer efficiency.If the guns are too far away the powder will be pulled away from the part by gravity or airflow. If the gun is too close, voltage will decrease and current will increase. As the gun current exceeds optimum levels, more ions are created and they adhere faster to the part which results back ionization. For the manual application, recommended distance of the gun from the part is 15 - 20 cm and 20-30 cm for automatic application.

Conveyor density: Position of the hangers will effect Transfer Efficiency . Increasing the numbers of hangers as close as possible to each will increase TE. Because, there will be less opportunity for powder to be sprayed into the air and out of the part.

Nozzle type: Different nozzles affect Transfer Efficiency. The two most widely used nozzles are the fan spray nozzles and conical spray nozzles. A fan spray nozzle has a large cloud of dust with a higher velocity.Conical nozzles have a softer forward velocity with different pattern cloud of dust dependenton the diameter of the nozzle.You should test different nozzles to see which one is best for your application.

Humidity and temperature: Both humidity and temperature can affect the performance of a powder coating system. Because change in temperature and humidity may affect fluidization, filter efficiency, filter life, and charging capabilities of the powder(consistent and efficient spraying). Too much heat can start the physical/chemical change in powder.Too much humidity can cause powder to clump. Too much dry air can cause problems with charging. For maximum TE , temperature of the environmental room should remain at less than 25°C and relative humidity should remain at 50-60% percent.

Grounding: Proper grounding is one of the most critical points for Transfer Efficiency. If the ground is not good enough, the powder will move in different directions with lower efficiency, causing a greater number of thin and thick coated parts and increasing powder waste. The ground should always be maintained and all components must be grounded with a resistance to ground not exceeding one megohm.

Powder particle size: Proper particle size distribution is important for Transfer Efficiency . Finer particles are more difficult to fluidize and pump. And smaller particles carry more charge per unit weight. Even though small particles charge efficiently , they tend to be influenced by the airflows resulting in poor transfer efficiency . Larger particles are more likely to have straight -line motion and be affected by strong electrostatic force lines or gravity. If particles are too large, they tend to fall to the booth floor as a result of gravity.The fines deposit on the flatter surfaces more readily and making it more difficult to penetrate Faraday areas.Larger particles with a better straight-line motion, provide better penetration to the inside corners . If the thickness of the film builds are not increasing and penetration is becoming more difficult, the powder particle size blend may have too many fines.

Packaging and storage

Powder packaging is provided in PP bags and carton boxes – up to 25 kg.
Powder should be stored in the optimum conditions of less than 25°C and approximately 50 – 60% relative humidity. Under these conditions most powder should be readily usable for at least a 12 month from date of manufacturing . Higher temperatures and longer storage periods will bring the risk for absorption of moisture.
It is important that powders should always be:
– Protected from high heat (› 25°C)
– Protected from humidity and water
– Protected from other dust and dirts

Ideal Virgin to Reclaim Powder Ratio

The most advantageous feature of the powder coating is to have chance to use recycle.Considering negligible loss in the collection filtering systems and on part hangers , approximately 95 % of the powder coating can be recovered and reused.
In general, reclaim ration is between 25%-15% of virgin powder by volume(25 reclaim + 75 virgin). The ideal amount is 15% by volume, which keeps particle size distribution of the blend with very little changes. Determining the amount of recycling, you should know your first transfer efficiency. The first transfer efficieny is mostly depending on entire application process and system maintenance (guns, hoses, grounding,etc.)Insufficient maintenance will cause increase in the amount of reclaim powder in the collector and this causes the amount of reclaim to increase.
– Poor grounding will affect your transfer efficiency and cause reclaim to increase
– You can not paint for a long time with the fixed setting values, since reclaim will change the particle size in the feed box, you will need to adjust the gun settings for the long-running works in order to maintaining surface appearance.
NOTE: All those we mentioned above are for smooth surfaces. For texture, wrinkle and other special effect powders, the amount of reclaim may be less in order not to cause changes in appearance-effect.

ELEKTROSTATIC POWDER PAINT

Glossary of Terms

Acrylic - A powder coating material with a high content of a polymer consisting of short chain esters of several acrylic monomers.
Additive - A material added to a powder coating material to improve one or more properties.
Adhesion - The firm attachment of a coating to a substrate or another coating.
Air, compressed - Air at any pressure higher than the atmospheric pressure.
Alkaline - An environment that has the characteristic of being strongly basic (high pH).
Ambient Temperature - The usual, or surrounding, environmental conditions.
Anti-oxidant - A compound added to powder coating materials to slow down the oxidation.
Application - The process of applying a powder coating material onto a substrates surface.
ASTM - American Society for Testing Materials , being the institute that controls standards for materials, systems and services.
Atlas (Xenon Arc) Weather - Ometer (ASTM G 26 , Method A) - An accelerated test which simulates the effects of weathering through the use of a filtered zenon arc light source.
Back Ionization - An excessive build - up of charged powder particles during electrostatic application which limits the ability of additional powder to be deposited onto the substrate; can neutralize the electrical charge of subsequently sprayed powder particles.
Binder - The polymer(s) as the main component of the powder that will polymerize later and binds the other components into the solid powder coating film.
Blistering - The effect, usually at the scribe, of blisters formed under a cured powder film.
Blooming - A haze on the surface of a coating which can be easily removed.
Bonding - The firmly joining together of a powder coating film to the substrate or of two coating films.
Brightness - The degree to which a surface reflects light (see Gloss).
Bulk density - Mass per unit of volume including the air filled voids in the bulk material.
Caking - Agglomeration of individual powder particles or sticking of powder to walls or components of equipment.
Cartridge filter - A filter construction containing one or more cartridges that function as a filtering element.
Catalyst - A material that accelerates the crosslinking, hardening or curing reaction of a mixture of polymers or polymers.
Chalking - Degradation of a coating due to UV exposure, which results in loss of colour and gloss.
Chromating - Preparation process for metal substrates, in the form of a conversion coating using chromium, and forming an inert chromate coating film, prior to the application of powder coating material.
Classifier - An equipment to separate particles from another fluid, much like a cyclone, whereby the separation cut is adjustable, within a range, with an additional device.
Clean Air Act - Act which empowers the EPA to improve the quality of air through enforcement of the developed pollution standards.
Clear coat - A non - pigmented coating applied on a base metal such as aluminium or over a previously applied pigmented coating.
Coating powder - Powder material being a mixture of polymer, pigment , filler and additives, for application on substrates with the objective to form a coating film thereafter. See also powder coating material.
Compatibility - The capacity of coating powders from either different sources or of different compositions when combined and applied which yield no visible or mechanically measurable differences in the cured film or application properties.
Composition - The parts of a mixture, formulation or recipe, usually expressed as percentages.
Contamination - Any foreign material, such as soil, dirt or unwanted chemicals, that deteriorate the quality of the coating film.
Contrast Ratio - A value related to the hiding power of a coating which must be reported at a specific film thickness; the ratio of the reflectance of a coating is measured over black and white backgrounds at the same film thickness; the results are measured as a numerical value – in general, a 0.98 contrast ratio is visually opaque; directly related to product pigmentation; minimum film thickness with full coverage of the substrate is critical (see also Hiding Power or Opacity).
Conversion coating - Preparation process for metal substrates, with the help of iron, chromium or zinc, prior to powder coating application.
Conveyor - A chain mechanism that transports the parts to be coated, in a hanging position, through all steps of the application process.
Corona Charging - The induction of powder particles exposed to an electrostatic field generated by a high voltage device.

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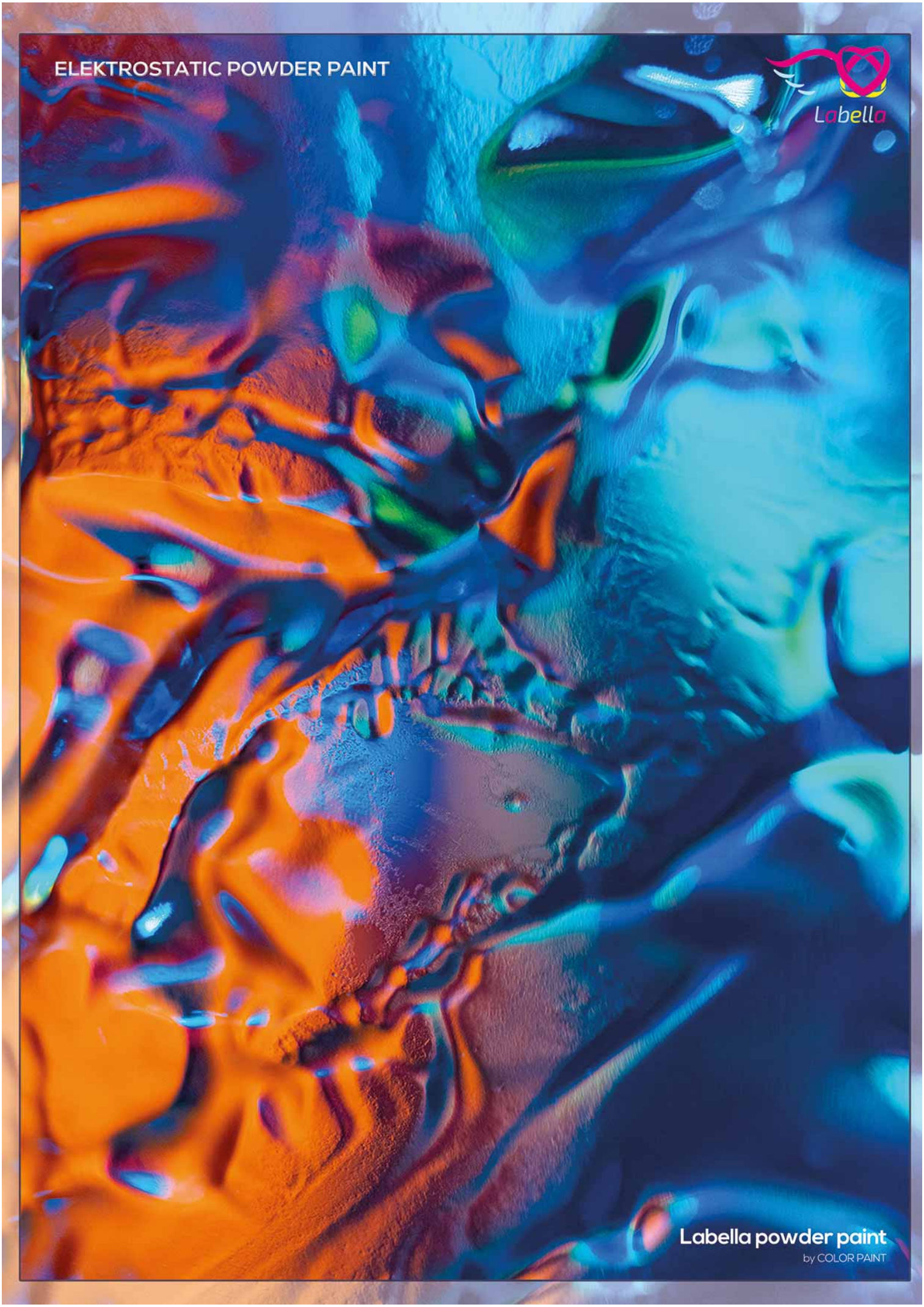

Labella powder paint

by COLOR PAINT

ELEKTROSTATIC POWDER PAINT

Glossary of Terms

Corrosion - Decomposition or reaction with oxygen, water, or other chemicals, when exposed to a particular environment.
Coverage (calculated) - Determines the m2 / kg adjusted accordingly for application film thicknesses.
Cracking - The arising of crevices or cuts in the surface of a coating film by chemical or mechanical influences.
Cratering - The appearance of tiny pitts (like mini craters) visible to the trained eye without enlargement at the surface of a powder coating film, usually due to some form of incompatibility.
Cross contamination - The deterioration of a coating film occurring when powders are used in mixed form when they are not compatible.
Cross hatch - A testing method to investigate the adhesion properties of a coating film.
Crosslinking - The multi-directional linking together of polymer molecules through chemical reactions, stimulated by a curing agent.
Cure Schedule - The time at temperature necessary for a coating to develop specific properties.
Curing - The hardening or cross-linking process.
Curing agent - A crosslinker or hardener that stimulates the curing of a binder system.
Curing oven - An oven in which the powder coated parts are exposed at the required temperature so that the cross-linking reaction can take place for a pre-determined time.
Cyclone - A cylindrical type of equipment for separating particles from another fluid applying centrifugal forces.
De-ionized water - Water which has been treated such that it does not contain water foreign ions.
Delamination - Separation between two layers of coating, or a coating and the substrate.
Dielectric Strength - Property of an insulating material where electrical breakdown occurs under specific conditions of test, expressed in volts per mil.
Disbondment (see also Blistering) - The effect , usually at the scribe , of blisters formed under a cured powder film.
Dispersion - A suspension or mixture of particles in another fluidum.
Distinctness of Image (DOI) - The sharpness of an image reflected by a coating's surface.
Dry Crosshatch Adhesion (ISO 2409) - Determines the relative adhesion of a coating to the substrate.
DSC - A Differential Scanning Calorimeter can measure several thermodynamic properties of chemicals.
Dust - Particular matter which is, or has been, airborn with a particle size below 75 micron.
Dust explosion - The confined rapid combustion of dust particles which are airborn causing strong expansion effects.
Dwell Time - The length of time a part is in an oven.
Edge Coverage - The ability of a coating in its cured state to flow, build, and adhere to sharp corners, angles and edges.
Electrostatic charging - The process of transferring a static electric charge on powder particles.
Electrostatic Spray (Corona) Method - The induction of powder particles exposed to an electrostatic field generated by a high voltage device.
Emmaqua - Weathering test performed in Arizona where panels placed in a special apparatus are exposed to a brief water spray and magnified sunlight; ambient humidity is fairly low.
EPA - The Environmental Protection Agency is a USA Government Institute which regulates and controls organizations influencing the environment.
Epoxy resin - A thermosetting polymer, produced on the basis of epichloro-hydrin, which can be further polymerized by the addition of a hardener.
Etching - Surface preparation of metal by a chemical process ; removal of a layer of the base metal.
Extender - A type of pigment which also transmits special properties to a powder coating material.
Extrudate - The resulting product coming out of an extruder, be it in the initial molten form or the solidified state thereafter.
Extruder - A machine t hat mixes solid particles by using mechanical kneading and the subsequent heat-development until a molten fluidum is created of a homogeneous composition.
Faraday Cage Effect - The lack of penetration of powder particles into cavities or recessed areas of a substrate due to its configuration.
Fat edge - Thicker than usual coating film to be found along edges of a flat substrate.
Ferrous - Metal containing an amount of iron.
Field lines - Imaginable lines of force in an energy field (e.g. electrostatic).
Filiform - Corrosion or creep resembling a thread-like formation.

Glossary of Terms

Filler - Inorganic inert material; also extender or certain pigments.
Film thickness - Height of a cured coating film measured in microns.
Fines - Small powder particles, usually less than 10 microns.
Flash off - The process-step in liquid coating application of allowing the solvent to evaporate prior to curing.
Flash rust - A molecular film of rust appearing on a steel surface within minutes after pre-treatment.
Flexibility (Mandrel bend test, ISO 1519) - Measures a coatings' bend capability over a given shape.
Flop - A characteristic of metallic coatings to change color when viewed at different angles.
Flow - Measure of self-levelling; the nature of a coating which allows it to level or spread into a smooth film of uniform thickness before hardening.
Fluidity - The degree to which powder coating material can be brought to fluidization.
Fluidized bed - Container in which powder is kept suspended in air continuously.
Galvanized steel - Steel coated with a thin layer of zinc.
Gel Time - The interval of time at a given temperature required for a material to be transformed from a dry solid, through a liquid state, to a gel-like condition; measured in seconds at a given temperature.
Glass Plate Flow/Hot Plate Melt Flow (HPMF)/Incline Plate Flow - A measurement on an inclined surface when powder is in a molten state; usually measured in millimetres at a given temperature and angle.
Gloss (ISO 2813) - Surface reflection of directed light, measured in units; the most common angle of measurement is 60°; a 20° angle should also be considered for certain full gloss formulations and an 85° angle for low gloss products.
Grounding - The principle of bringing the electrical potential in equilibrium with a neutral mass.
Hardener - See curing agent.
Hardness - The ability of a cured powder coating film to withstand the penetration of a standardized object.
Hazardous - A condition of contact or case of presence in which a risky, dangerous or less healthy or toxic situation is created.
Hiding Power - The extent to which a powder coating masks the color and pattern of the surface to which it is applied at a given film thickness (see also Contrast Ratio or Opacity).
Humidity Resistance (DIN 50017) - Measures a coating's ability to withstand exposure to 100% relative humidity at various temperatures.
Hybrid - A polyester or acrylic powder coating material which has been epoxy-modified.
Hygroscopic - The tendency of a substance to attract or absorb moisture from the air.
Impact Fusion - The tendency of powder particles to fuse with other particles at points of impact in the application equipment during the application process.
Impact Resistance (ASTM D 2794, Direct/Reverse) - Measures a coating's ability to withstand a force; expressed in Nm; results can be affected by type of substrate, film thickness, or diameter of indenter.
Incompatibility - The impossibility of powders to be used and applied in a mixture of any composition, without any visible or mechanically measurable differences of the resulting powder coating film when compared to the virgin materials.
Infrared (IR) Cure - A method of curing powder which utilizes direct exposure to light energy in the IR region of the light spectrum.
Infrared radiation - Energy in the infra-red region of the electromagnetic spectrum just above the visible light range.
Inhibitor - An additive used to delay or neutralize a chemical reaction.
Inorganic - The sort of materials not containing carbon compounds such as metals and its derivatives.
Intercoat Adhesion - The ability of a coating to adhere to previously applied films.
Karl Fisher test - Chemical testing method to determine the moisture content of powdery materials.
LEL - The Lower Explosive Limit is the lowest concentration of organic powder suspended in air which can be brought to explosion when ignited by a standardized energy source.
Levelling - A powder's ability to flow into a smooth, uniform thickness (free from defects).
Mandrel bend test - A mechanical method for testing the flexibility of a coating film applied on a standardized sample plate.
Mar Resistance - A coating's ability to withstand contact without blemishing.
Metal Temperature - The temperature of a part at any time during the cure cycle; varies based upon mass of part and dwell time.
Metamerism - A definition applicable to a coating film when its color appears different when viewed in light of varying wavelengths.

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Micron - Standard unit of measuring a coating film thickness. (1/1000 of 1mm).
Micronizing - Grinding powder to the range of microns.
Mil – Standard unit of measuring film thickness in USA (1/1000 of an inch) equivalent to 25.4 mirons.
Monomer - A molecule that has the ability to chemically react with another monomer by forming a long chain of identical sections, the polymer.
MSDS - A Material Safety Data Sheet provides the hazardous components, other safety and health hazards, protection equipment and first-aid procedures.
NFPA - The National Fire Protection Association is a USA organization that indicates the health, reactivity and flammability hazards of chemicals.
Non ferrous - A material containing no iron.
OEL - The Occupational Exposure Limit relates to the exposure limit by inhalation and refers to the concentration of hazardous materials in the atmospheric air.
Opacity - The ability to hide the underlying substrate at a given film thickness (see also Contrast Ratio or Hiding Power).
Orange Peel - A surface appearance which has an irregular appearance similar to the skin of an orange and is generally caused by restricted the limited flowing ability of the powder coating material.
Organic - The sort of materials containing carbon compounds such as many polymers, certain pigments and additives, etc.
OSHA - The Occupational Safety and Health Administration is a USA organization for the control of safety and health issues.
Out-Gassing - Air or gas that escapes from the sub- surface beneath or within the coating and causes blisters, bubbles, or small holes; frequently occurs with zinc or aluminium castings or galvanized steel.
Over-bake - The application of heat using more time and/or temperature than is required for cure which often causes the coating to become too brittle; color and gloss may be adversely affected.
Over-curing - The application of higher than recommended curing-values (temperature, time or both).
Overspray - Material not deposited on the part or rack; it may be recovered with the appropriate equipment.
Particle Size Distribution (PSD) - The overall range of particles (from coarse to fine) resulting from the grinding process; measured in microns; varies with product.
Passivation - Chemical treatment of a metallic surface with the objective to make it less reactive.
Pencil Hardness (ASTM D3363-74) - Relative rating of a coating's ability to resist scratching; measured as mar and/or gouge.
Penetration - Ability of particles to penetrate towards and onto the surfaces of Faraday cage like areas such as cavities and recesses.
Phosphating Preparation - Process for metal substrates, in the form of a conversion coating using iron (chromium) or zinc, and forming an inert phosphate coating film, prior to the application of powder coating material.
Pickling - A cleaning step of hot rolled steel plate, usually carried out in the steel mill, to remove the milling scale before the metal is oiled to protect it from corroding.
Pinhole - The appearance of tiny holes (like from a needle) visible to the eye without enlargement at the surface of a powder coating film, usually due to the insufficient ability of gasses to escape from the molten film during curing.
Plate flow - A test to measure the ability to flow during the curing of a powder during which a compressed pile of powder is placed on an inclined plate that is subjected to a preset temperature.
Polyester - A thermosetting polymer, saturated carboxyl or hydroxyl terminated, which can be further polymerized by the addition of a hardener.
Polymer - A long molecule that has been formed out of a large series of monomers by a chemical reaction.
Polymerization - The reaction in which a large molecule (polymer) is formed by chemically binding identical sections (monomers) to a long chain. Curing reaction.
Post-formability - The ability of a cured coating to withstand severe bending without the appearance of cracks.
Potable - Suitable for drinking.
Powder coating - The application of powder coating material on substrates in order to form a coating film thereafter.
Powder coating material - The ultimate dry solid compound including all necessary ingredients, ground to powder and ready to be applied as a coating material on a given substrate.
Powder pump - A lifting and moving device that applies air for transporting either powder from one container to another or towards an operating device.

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Pre-mixing - The mixing and size reduction of all necessary raw materials for the production of powder coating material prior to feeding them to the extruding step.
Pretreatment - The preparation of a part prior to the application of a coating powder in order to improve adhesion and corrosion resistance.
Primer - A coating applied to a surface to improve adhesion of a topcoat and/or improve corrosion resistance.
QUV - Accelerated weathering test performed at elevated temperatures in which coated panels are exposed to regular cycles of intense UV light alternated with dark cycles where water is allowed to condense on the panels.
Radiation curing - The application of energy -rays of a particular range of the electromagnetic spectrum for curing of a coating layer.
Reclaim - Any material not deposited onto parts; usually mixed with virgin material for future applications.
Recoatability - A cured coating's ability to accept another coat.
Recovery - The entire process step of the powder application process in which the non-deposited powder is reclaimed, recycled and added to the virgin powder for re-use.
Recycling - The action in the powder recovery step of the powder application process by which the reclaimed powder is fed back.
Reflectance - The percent of light reflected at a given wavelength; the illuminant, degree of observer and the wavelength must be specified; color (not gloss) dependent – whites will have the highest values.
Reflectivity - The reflectance of a coating at a film thickness such that any further increase in thickness will not affect the amount of light reflected.
Resin - A polymeric, organic material, be it from a natural or a synthetic source, which can be further cross-linked or polymerized by the addition of a hardener.
Respirator - Safety breathing face-mask.
Rework - A correction procedure to correct shortcomings on a powder coated article.
Salt spray test, acetic (ISO 9227) - The degree of corrosion determined at the scribe based upon a prescribed time period; should be tested with a control.
Scale – Rust layer on steel originating from the hot roll steel-milling process.
Seal rinse - A step in the pre-treatment process where the metal surface is passivated to prevent corrosion prior to the powder coating of substrates.
Service Temperature (continuous or intermittent) - The temperature which a finish is able to withstand for an extended period of time or number of cycles without degradation.
Shelf Life - The period of time a coating retains its application and appearance properties if stored according to the manufacturer's recommended conditions.
Sieve - A screening mechanism applying a wire mesh to separate a certain portion out of too coarse or contaminated material.
Softening point - The temperature at which a polymer or a powder coating material first starts to melt.
Soil - Any foreign material that adheres to a substrates surface prior to the pre-treatment.
Solvent - A liquid of one or more components often applied in the liquid paint industry to dissolve paints.
South Florida Exposure (ISO 2810) - Exposure to typical heat, humidity and sunlight conditions at southern latitudes; measurements are generally the change in gloss and/or colour (Delta E).
Specific Gravity - The density of a formulation relative to water.
Spray booth - A special cabin in which powder coating material is sprayed, manually or automatically, onto substrates under strictly controlled conditions.
Stripping - The procedure to remove a coating film from a substrate in order to be recoated.
Substrate - The article or product to be powder coated.
Surfactant - Chemical additive to control the surface tension of a material.
Taber Abrasion - Resistance to wear.
Temperature Stability - Appearance and adhesion after a period of time at a prescribed temperature and film build.
TGIC - Triglycidyl Isocyanurate is a curing agent for carboxyl terminated polymers.
Thermoplastic - A powder coating which will repeatedly melt when subjected to heat and solidify when cooled.
Thermoset - A powder coating which, when subjected to heat, undergoes an irreversible chemical reaction during the cure cycle.

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Glossary of Terms

TLV - The Threshold Limit Value is the concentration of chemicals in air to which persons may be daily exposed without harm.
Touch-up - The repair of small damages on a coating film or the paint to be used for that purpose.
Toxic - Poisonous.
Transfer Efficiency - The amount of powder attracted to the part compared to the amount of powder sprayed; measured as a percentage.
Triboelectric Spray Method - Powder particles receive an electric charge through the use of frictional contact with a nonconductive material.
UEL - The Upper Explosive Limit is that concentration of organic powder suspended in air above which the mixture will not explode if ignited by a standardized energy source.
Ultra violet stabilizer - A chemical additive that absorbs part of the UV radiation in the sunlight.
Ultraviolet Radiation (UV) - Light energy from the UV region of the light spectrum which can break certain chemical bonds and contribute to the fading and wear of coatings.
Undercured - The application of an insufficient curing temperature, time or both.
Urethane - A thermosetting hydroxyl functional polymer, usually reacted with an isocyanic curing agent.
Venturi - A special shaped restriction in a powder pump body.
Vibratory box feeder - A moving device that applies vibration for transporting powder from a box container to another hopper.
Virgin Material - Powder which has not been mixed with reclaim material.
Virgin Powder - Fresh powder coating material directly from the supplier not containing any reclaim.
Volatile Organic Compounds (VOC's) – Carbon based compounds which can undergo an atmospheric photochemical reaction, contributing to air pollution and causing ozone depletion.
Washer zone - The immersion or recirculating spray cleaning step of the pre-treatment system.
Water Resistance - A coating's ability to withstand immersion in water at prescribed temperatures for specified time periods.
Weatherability - Degradation caused by humidity, temperature, and exposure to sunlight.
Weld splatter - Contaminations left behind on a metal surface after welding such as slag or beads.
Wrap - A characteristic of coating powders during electrostatic application to seek out and adhere to areas of the substrate not in the direct line of sight of the delivery system end point.
Yellowing - Development of a yellow color or cast of a coating due to aging or cure variables; more evident in light colored formulations.

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PRODUCT COLOR

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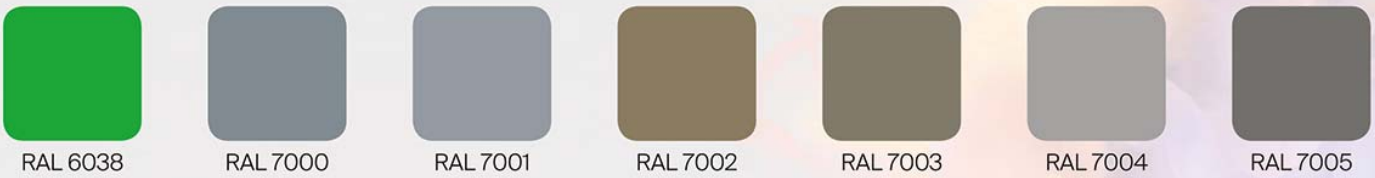

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PRODUCT COLOR

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RAL 7037 RAL 7038 RAL 7039 RAL 7040 RAL 7042 RAL 7043 RAL 7044

RAL 7045 RAL 7046 RAL 7047 RAL 7048 RAL 8000 RAL 8001 RAL 8002

RAL 8003 RAL 8004 RAL 8007 RAL 8008 RAL 8011 RAL 8012 RAL 8014

RAL 8015 RAL 8016 RAL 8017 RAL 8019 RAL 8022 RAL 8023 RAL 8024

RAL 8025 RAL 8028 RAL 8029 RAL 9001 RAL 9002 RAL 9003 RAL 9004

RAL 9005 RAL 9006 RAL 9007 RAL 9010 RAL 9011 RAL 9016 RAL 9017

RAL 9018 RAL 9022 RAL 9023

Powder Paint Collections

Mat Collection,

Semi Gloss Collection

Textured Collection

The Gloss Collection

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Mehmet Akif Cad. No: 39
Kısıkköy-Menderes- izmir / Turkey

Phone and Mobile :
00 90 530 948 42 35

www.labellapaint.com
labellapaint@gmail.com