

**Type of coating** PA - POLYESTER POWDER COATINGS

**Color** RAL 9006

**Symbol** PA142/0/2326/20FX

**Surface** Coarse structure

**Gloss** Semi-gloss

**Characteristics**

- Outdoor, industrial application
- Good weather resistance
- Good chalking resistance
- Very good covering power
- Decorative and metallic effect

**Applications** Agricultural machinery, furniture and garden tools, machine casings, mailboxes, etc.

**Powder properties**

<b>Particle size (Malvern)</b>	Fine powder suitable for electrostatic spray (corona)
<b>Density (g/cm<sup>3</sup>)</b> ISO 8130-2	1,481
<b>Theoretical coverage (m<sup>2</sup>/kg)</b>	~8 by the film thickness 90 µm and 100 % use of powder coating.
<b>Storage stability</b>	24 months from the date of production, in the original, unopened package, keep away from heat sources, in the temperature of 5 – 25°C, protect from moisture. No direct sun exposure. The product should be stay at ambient temperature (paint shop) 12h before use.

**Coating film**  
tested in lab conditions on:  
steel panel

<b>Thickness</b> ISO 2808	recommended 90-120µm
<b>Gloss (60°)</b> ISO 2813 <sup>1</sup> VISUAL <sup>2</sup>	semi-gloss
<b>Cross cut</b> ISO 2409	0
<b>Mandrel bending</b> ISO 1519	<5 mm
<b>Erichsen cupping</b> ISO 1520	>5 mm
<b>Impact resistance</b> ISO 6272-1	front >50 kg/cm reverse <50 kg/cm
<b>Buchholz hardness</b> ISO 2815 <sup>3</sup>	n/d
<b>Pencil hardness</b> ISO 15184 <sup>3</sup>	n/d

(1) applies to smooth and no metallic coatings film  
(2) applies to structural and metallic coatings film  
(3) not applicable structural coatings film

<b>Surface pretreatment</b>	<ul style="list-style-type: none"> <li>- The overall quality of the coating film depends on the type and quality of the pretreatment.</li> <li>- Surfaces must be dry, degreased and free from rust and other contaminants.</li> <li>- In order to improve coating adhesion to the surface and improve resistance it is recommended: <ul style="list-style-type: none"> <li>aluminium - chromating, chrome-free pretreatment or anodic pretreatment.</li> <li>steel and galvanized steel - individual choice of surface pretreatment (e.g. phosphating).</li> </ul> </li> <li>- However, in order to achieve optimum results, you must follow the instructions and recommendations of the pretreatment material manufacturer.</li> </ul>
<b>Application</b>	<ul style="list-style-type: none"> <li>- Electrostatic gun - corona (recommended voltage - 60 kV).</li> <li>- In case of use tribo gun a flattened structure is obtained.</li> <li>- Application parameters depend on the geometric shapes of the detail and the film thickness to be reached.</li> <li>- Responsibility for the correct application parameters lies on the coating applicators.</li> <li>- Despite careful production methods, slight deviation of color and effect between the different manufacturing batches may occur (typical for powder coatings).</li> <li>- Various application parameters may cause color/effect changes.</li> <li>- Proper grounding of application equipment and coated elements helps to keep repeatability of the obtained color/effect.</li> <li>- It is recommended to do the entire order on the same equipment, with the same application parameters and using powder coating from one production batch.</li> <li>- Not be mixed with other powder coatings.</li> <li>- Control the air speed during application of powder coatings.</li> <li>- Keep the appropriate distance: the gun - coated elements.</li> <li>- Keep a uniform thickness of coating.</li> </ul>
<b>Curing conditions</b>	<ul style="list-style-type: none"> <li>- Curing time recommendation in a convection oven: <ul style="list-style-type: none"> <li><b>180°C/10min.</b></li> <li><b>170°C/15min.</b></li> <li>(object temperature)</li> </ul> </li> <li>- Must be strictly observed parameters of stoving the coating film to ensure that the full mechanical and chemical properties.</li> <li>- Suitability of the product for stoving in gas ovens and radiant ovens should be verified - may be a significant difference in color - perform a comparative test with the standard color (please contact us for details).</li> </ul>
<b>Approvals</b>	<ul style="list-style-type: none"> <li>- The powder coatings are in compliance with 2011/65/EC and 2015/863/EC (so called ROHS).</li> <li>- Heavy metal and TGiC free.</li> </ul>
<b>Technical recommendations</b>	<ul style="list-style-type: none"> <li>- In the case of cleaning powder coated surfaces it is necessary strict compliance with the Technical recommendations 01: Cleaning of powder coated surfaces.</li> <li>- Detailed information of the usage of metallic powder coatings are in the Technical recommendation 04: The application of metallic powder coatings.</li> <li>- Detailed information of the usage of the product are in the Technical recommendation 06: The use of powder coating with medium and coarse structure.</li> </ul>
<b>Comments</b>	<ul style="list-style-type: none"> <li>- To print, to glue, to label, to laminate with foil, over-coating or any other post-treatment, some preliminary testing is recommended.</li> <li>- Powder-coated details should be packaged after being completely cooled down to ambient temperature, into appropriate packaging materials previously tested by the user.</li> <li>- Packaged details should be stored under cover to avoid condensation, which may result in traces on the finished coating.</li> </ul>
<b>Safety Data Sheet</b>	POLYESTER POWDER COATINGS PA/FX - TI
<b>Edition / date</b>	2.1 / 2023-07-07

*The above values may vary depending on the type of surface pretreatment, color, gloss, texture, etc.  
All informations included in this card are based on our experience and actual knowlegde and do not release the user from carrying out their own tests. If in doubt please contact us for details.  
Having no influence on the use and application conditions, we can take responsibility only for the quality of any the product and ensure that it fits to our standards.  
This Technical Data Sheet is revised periodically. EKO-COLOR reserves the right to change specifications without notice.  
If necessary, our sales department will confirm the validity of this document.*



**EKO-COLOR**

## **TECHNICAL RECOMMENDATION 04: THE APPLICATION OF METALLIC POWDER COATINGS**

### **1. Description**

Metallic powder coatings are thermal curing products which allow for obtaining coats with interesting visual effects. This results from the fact of using metallic pigments which, owing to their characteristic plate structure, enable obtaining coruscating surfaces. A varied quantity of pigments in powder coating and their specificity make powder coatings with a metallic effect very sensitive and the final outcome depends on many factors. This Technical Sheet is to facilitate painters' work consisting in applying dry blend metallic coatings and to attract attention to crucial painting stages.

### **2. Metallic powder coatings division**

Depending on a manufacturing method, metallic powder coatings may be divided into

Dry blend – most popular on the market and produced by Eko-Color Ltd.

In this type of coatings, base coating is blended with a metallic pigment, thus obtaining a heterogeneous, non-uniform blend. Particles responsible for the effect are not bonded permanently to the base coating (basic coating) what brings in difficulties during application, the presence of single small clusters on a coat and lower repeatability of the final appearance of the coat.

Bonded – these coatings are created through “melting” a metallic pigment into a base coating particle what prevents pigment separation. This coating is more homogeneous and stable during application what results in obtaining higher repeatability of the metallic effect. The cost of such a powder coating, as compared to dry blend powder coatings, is significantly higher.

### **3. Colour stability/tolerance**

Eko-Color Ltd. produces powder coatings with the use of high quality metallic pigments and the production process itself undergoes constant monitoring and control at each stage. The specific structure of metallic pigments and their varied settlement on the surface of the detail coated hinder keeping a uniform shade of metallic powder coating and is conducive to the presence of minor deviations within the coated material batches.

### **4. Application**

- Metallic powder coatings must be applied by the electrostatic spray method (corona). Recommended voltage 60 kV. Current values should not be high because a metallic pigment, under the influence of high current, is distributed unevenly and it resembles a mosaic.
- It is recommended not to exceed 30 uA, depending on voltage, the higher voltage – the lower current. However, final set values are determined by the paint shop personnel.  
As far as tribokinetic (tribo) application is concerned, a different appearance of a final coat is obtained than with the corona application. Tribo application must always be checked before using the powder coating in order to accept a colour and final visual outcome.
- Loading change (from corona to tribo and from tribo to corona) is forbidden because it leads to significant differences in colour/final effect.
- Using metallic powder coatings is connected with the fact that the various types of applications, devices, parameters and detail shapes affect obtaining different results/coat effects. This is caused by a difference in polarity and changeable efficiency in the spray gun cascade connected with the correct detail grounding not exceeding 800 kiloohm.
- It is observed that in the event of application with the use of different manufacturers' devices, various final outcomes are obtained.
- The more complex shape of the detail being coated is, the more visible differences are in the visual effect.
- Jets must be dedicated to the shape of the coated detail. Flat details – slotted jets, rounded details (rods, pipes) – round jets.
- An optimal coating effect is obtained by coating on an automatic line, while keeping a proper applicator distance from the coated detail. In manual coating, it is difficult to keep constant and uniform coat thickness what in the event of metallic powder coatings means lighter and darker stripes.
- The application of metallic powder coatings must ensure the uniform supply of powder to the applicator. It is recommended to use fluidised feeders which enable the uniform mixture of metallic pigment and powder coating, with the simultaneous fragmentation of possible agglomerates. It is not recommended to use vibrating feeders, which are popular in paint shops, because vibration may lead to the separation of pigment and base powder coating.
- Powder coating fluidisation in the container should take place in a moderate manner. It is not allowed to aerate the container excessively because this will cause the formation of visible volcanoes on the aerated coating. Incorrect fluidisation will lead to heavy metallic pigment dropping to the container bottom, and then the suction system will collect excessive metallic pigment and, consequently, it will lead to the concentration of pigment on the surface of the detail being coated.
- An important parameter is the parameter of cleaning the gun electrode. Correct pressure value: from 0.15 to 0.20 bar.
- The whole application installation and the elements being coated must be grounded properly what, basically, contributes to the preservation of correct metallic shade and it does not lead to the binding of paint fraction in the container. It is necessary to pay special attention to the grounding of injector pumps (if application is carried out by means of such pumps).
- It is necessary to apply a coat with the uniform thickness. This is particularly important in the event of dark colours where significant thickness differences lead to the formation of a heterogeneous surface with visible smudges and shadows. The detailed data characterising the product are described in the product technical sheet.
- It is not allowed to mix it with other powder coatings.
- It is important to preserve purity in the entire coating installation before filling with powder coating, or in the event of changing to a different type of powder coating, in order to eliminate possible coat defects, e.g. impurities.
- Regardless of the careful cleaning of the coating installation, during daily work, it is necessary to conduct maintenance works recommended by the installation manufacturer (e.g. cleaning lines supplying powder, jets, electrodes) and replace consumables.
- It is particularly important to pay attention to the technical condition of powder hoses due to the fact that metallic powder coatings contains sharp fractions which cause faster wear and tear of powder lines. As a result of friction, notches are formed inside the powder line which hold powder coating fractions, causing powder coating agglomeration in points. Moreover, a very important role is played by an electro-conductive core which, when damaged, will not allow for the free transfer of excessive ions to the grounding installation.

## 5. Recovery

- Metallic powder coatings, on account of their structure, are not recovered to the same degree as powder coatings without the metallic effect.
- Basically, metallic powder coatings should not be processed in order to eliminate changes in colour caused by the loss of a metallic effect.
- In the event of filter recovery, a metallic pigment may concentrate, and in the event of cyclone recovery, it may be reduced.
- As far as cyclone recovery is concerned, a darker colour shade is obtained. This is because the finest particles of powder coating and metallic pigment are not separated and they are treated as impurities which are eliminated on a continuous basis. Such a separation results in the change of the proportion of effect – basic colour.
- If recovery is necessary, it is required to take care of the proper dosing of a recovery powder in relation to a fresh powder. It is possible to dose approx. 15% of recovery powder coating, provided that optimal mixing with the fresh powder coating is ensured. However, in such a case, the responsibility for obtaining the acceptable and repeatable effect is borne by the paint shop.
- When working with a powder coating from recovery, it is necessary to conduct frequent checks aimed at verifying the appearance of the obtained coat.
- The use of the recovery powder coating alone or repeated powder recovery is forbidden.
- A good practice before starting the production process is preparing limit templates and using them during production in order to check the colour and the effect.

## 6. Curing conditions

- It is obligatory to follow curing parameters. **Curing time runs from obtaining the set temperature by the detail in the curing process.**
- A condition to obtain a uniform coat is even temperature distribution in an oven and maintaining polymerisation as part of a curing window. For this purpose, it is necessary to conduct the thermographic test of the oven.
- Insufficient curing time or curing in excessively low temperature results in the formation of coats with a lighter shade (more metallic), excessive gloss and insufficient mechanical properties.
- Excessive curing time or curing in excessive temperature may result in colour change, yellowing and the formation of more mat coats.
- Thick-walled details require more time to cure as compared to thin-walled details, what is reflected directly in obtaining a different final visual effect.
- If a detail is not cured to the required temperature, the coat does not obtain mechanical strength and chemical resistance. As a rule, a shade obtained is lighter (more metallic colour) than the required one and there is no effect of structure built-up (in the event of metallic structural powder coatings).

## 7. In a few words

- The application of metallic powder coatings requires constant control during the coating process, as well as the ongoing control of the obtained effect as compared to the template.
- It is necessary to ground properly all the elements affecting the coating process – details, cabin, conveyor, applicators.
- It is recommended to check the powder painting installation grounding once a year.
- It is necessary to remember about powder painting tag cleanliness (proper grounding to max. 800 kiloohm).
- When changing a powder coating, all the powder painting installation elements responsible for coating feeding and/or recovering must be cleaned carefully.
- The recovery of dry blend metallic powder coatings is not recommended.

## 8. Storage conditions

Store in accordance with data provided on the label and in the Technical Data Sheet for the product, in original unopened packaging, away from heat sources, in the temperature of 5 – 25°C, free from any moisture. The product should be kept in the ambient temperature (of the paint shop) for 12 hours before use.

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## **TECHNICAL RECOMMENDATION 06: THE USE OF POWDER COATING WITH MEDIUM AND COARSE STRUCTURE**

### **1. Description**

Powder coatings are thermosetting products designed for painting metal elements for protection and decorative purposes. The coatings have a relatively coarse and visible texture.

The purpose of this product data sheet is to facilitate the work for painters who use powder coating easier and to describe the key stages of painting.

### **2. Substrate preparation**

When applying coarse-textured powder coatings, it is essential to carefully clean the substrate. Greasy surfaces or surfaces contaminated with foreign materials cause defects in the finished coating or make it impossible to achieve the desired texture.

### **3. Application**

- Medium and coarse coatings should be applied by electrostatic spray painting (corona). Application settings are determined by the paint shop staff.
- **When using a tribo powder coating gun, a flattened texture is achieved.** This type of application must always be verified in advance in order to assess the final visual effect.
- Changes in the application method (from corona to tribo and vice versa) lead to significant differences in the final result.
- It is necessary to finish the entire project using the same equipment and maintaining constant application parameters.
- Based on observation, application with equipment of different manufacturers yields different final results.
- Different types of application, equipment, application parameters and shapes of elements affect the coating effects.
- The optimum effect is achieved when the distance between the applicator and the coated element is sufficiently large (approx. 30 cm), while maintaining a constant and even coating thickness.
- A constant supply of powder coating to the applicator must be ensured. The use of fluidised-bed powder feeders is recommended.
- The entire system and coated elements must be properly earthed.
- **The final appearance of the texture (size and type) depends to a large extent on the thickness of the applied coating.**
- For an even texture, an average thickness of 90 - 120 µm is recommended.
- Details are specified in the data sheets of the respective products.
- When applying medium and coarse powder coatings, variations in coating thickness on individual elements of the structure should be avoided in order to maintain a uniform appearance of the coating.
- **It is very important to ensure cleanliness of the entire coating system**, including guns, hoses, etc. before filling it with powder coating or when changing to a different type and colour of powder coating, in order to avoid contamination of the structure with a different colour (mainly when changing from smooth powder coating to medium and coarse one) or coating defects in the form of craters, pinholes, orange peel (mainly when changing from coarse-textured powder coating to a fine one). In both cases, the defects are highly visible on the structure.
- In addition to thorough cleaning of the system, during daily operation, maintenance works recommended by the system manufacturer (e.g. cleaning of powder supply lines, nozzles, electrodes) should be carried out and worn parts replaced at appropriate intervals.

### **4. Recovery**

- Medium and coarse powder coatings are not designed to be recovered to the same extent as fine-textured coatings.
- In principle, coarse-textured coatings should not be recovered, which will prevent irregularities in the final appearance.
- If recovery is required, an adequate dosage of recovered powder in relation to fresh powder should be ensured. The amount of recovered powder should be kept to the minimum, and optimal mixing with fresh paint should be ensured. The responsibility for achieving an acceptable and reproducible result lies with the paint shop.
- When working with recovered powder coating, frequent inspections are necessary to check the appearance of the result.
- The use of recovered powder alone or repeated recovery of powder is prohibited.
- It is good practice to prepared tolerance models before launching production and use them throughout the process to verify the final appearance of the result.

### **5. Curing conditions**

- The recommended curing parameters must be strictly adhered to. **The curing time is counted from the moment the element is heated to the set temperature.**
- Uniform temperature distribution in the oven is required to achieve a homogeneous texture of the coating.
- In order to determine the required curing parameters, it is always advisable to carry out tests under production conditions adapted to the element and the oven (it may be helpful to prepare a temperature profile of the oven using a suitable instrument).
- **In the case of medium and coarse powder coatings, the element must be placed in the oven which has been preheated to the required temperature (the temperature should not be lower than 130°C).**
- The curing time depends on the heat capacity of the elements (the design of the elements, their shape, size, thickness and quantity is important) and the temperature parameters in the oven. It is up to the paint shop to adjust the required heating parameters to the element/structure.
- Excessively slow curing of the element in the oven will result in a failure to achieve the desired texture.
- Excessively short curing time or curing at excessively low temperature results in coatings with an undeveloped and/or flattened texture, excessively high gloss and insufficient mechanical properties.
- Excessively long curing or curing at excessively high temperature may result in colour changes, yellowing and matt coatings, especially in the case of matt structures.
- Depending on the heat capacity of the elements and the temperature parameters in the oven, different and uneven textures can be achieved.
- Differences in curing conditions should be avoided, which means that thin-walled elements should be coated separately from thick-walled ones in order to achieve a reproducible coating appearance.
- Thick-walled elements take longer to heat up than thin-walled ones, which directly translates into a different visual effect.

## 6. Summary

- The application of medium and coarse powder coatings requires constant control during the process, as well as ongoing verification of the results with the model.
- The application of medium and coarse powder coatings should always be carried out using the same equipment and the same application parameters.
- It is essential that the coated elements and the entire coating system are properly earthed.
- In the case of medium and coarse powder coatings, the element must be placed in the oven which has been preheated to the required temperature (the temperature should not be lower than 130°C).
- When changing the powder coating, all powder feeding or recovery parts of the coating system must be carefully cleaned.
- Recovery of coarse-textured powder coatings is not recommended.

## 7. Storage conditions

Store in accordance with the parameters specified on the packaging label and product data sheet, in the original, unopened packaging, away from heat sources and moisture, at 5-25°C. The product should be kept at room (paint shop) temperature for 12 hours before use.

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*In case of using products with certificates or approvals, the guidelines of relevant associations must also be observed.*

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