

# MORE THAN FOUR-COLOR PRINTING

Printing with  
Kuncai Effect Pigments



## Kuncai More than Four-Color Printing

In an ever more colorful world, unique products have an increasingly hard time in getting themselves noticed. Creatives are constantly seeking new ways to differentiate their products. The print sector offers a wide range of options to achieve this. The designer and, ultimately, also the brand owner and the printer can choose from a whole host of substrates, colors, inks and coatings to produce memorable visual and haptic effects. This information is intended to give you an overview of the design possibilities Kuncai effect pigments open up for your print product.

### Effect Design

Paint effects give colors an added dimension and depth. From a subtle pearl sheen to a mesmerizing metallic sparkle, effect pigments help printed objects to stand out and make a statement. Effects range from silver white and colored pearl effects, to gold and metallic lusters. It is also possible to produce colors that change depending on the viewing angle by introducing special iridescent pigments.

Depending on the size of the effect pigment particles used in the ink, effects vary from silky matte to brilliant glitter. This also means that the finer the pigment is, the more opaque the film will be. Conversely, the coarser the pigment, the more transparent is the film.

# EFFECT DESIGN WITH...

## NATURAL MICA PEARLS

Pearl luster pigments can be produced from thin platelets of the natural mineral mica.

The platelets are covered with a thin layer of metal oxides such as titanium dioxide and/or iron oxide. The interaction with light refraction, reflection and interference creates unique shimmering color effects.



## PRODUCT FEATURES

- Low Transparency
- Good Reflectivity
- Wide Spectrum from Silver White to Interference to Gold and Metallic Luster
- Good Hiding Power
- More Uneven Surface Structure
- Some Natural Impurities
- Heavy Metal Content Influenced by Natural Substrate



## PRODUCT FEATURES

- High Transparency
- Exceptional Reflectivity
- High Chroma Colors
- Bright and Clear Base Color
- Intense Interference Colors
- Smooth and Very Even Surface Structure
- Low Heavy Metal Content
- Very Low Level of Natural Impurities
- Intense Metallic Sparkle
- Reduced Energy Consumption During the Production Process
- Environmentally Friendly Production Process (no Wastewater and no Air Contamination)
- Perfectly suited for abrasion sensitive printing systems

## SYNTHETIC MICA PEARLS

Kuncai's key product lines are pigments based on the company's core competence: synthetic mica. Its transparency and properties as a substrate ensure the pigment has a limited influence on the background color and allows for greater color intensity.

The thinness of synthetic mica platelets and their rounded particle structure produces a very even surface appearance after printing. Depending on the ink in which the effect pigment has been integrated, this can also result in improved haptic properties.

## GLASS FLAKE PEARLS

Our DinaStar and Diamond calcium sodium borosilicate-based pigment ranges achieve the highest transparency and the most intensive multicolor sparkle. These product lines have the most neutral base color (provided by the substrate) and the lowest influence on the background color. The products from these ranges furthermore add a lively sparkle to the final formulation.



## PRODUCT FEATURES

- Ultra-Transparent
- Exceptional Reflectivity
- High Chroma Colors
- Superb Interference Colors
- High Brightness and a Pure Colorful Gleam
- Intense Multi-Sparkle Tones in One Color
- Smooth and Even Surface Structure
- Low Heavy Metal Content
- Free of Natural Impurities

# PRINTING INK SYSTEMS

## KUNCAI EFFECT PIGMENTS CAN BE USED IN GRAVURE, FLEXTONE, SCREEN AND OFFSET COATING SYSTEMS FOR PRINTING

Owing to the range in coating thickness and the physical properties of the pigments, the following applies to all the various printing ink systems:

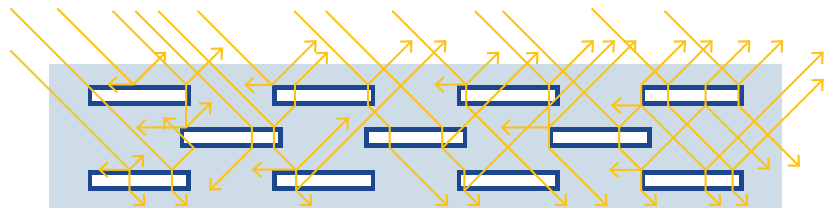
### THE THICKER THE COATING LAYER, THE STRONGER THE EFFECT

### THE HIGHER THE PIGMENT CONCENTRATION IN THE BINDER SYSTEM, THE STRONGER THE EFFECT

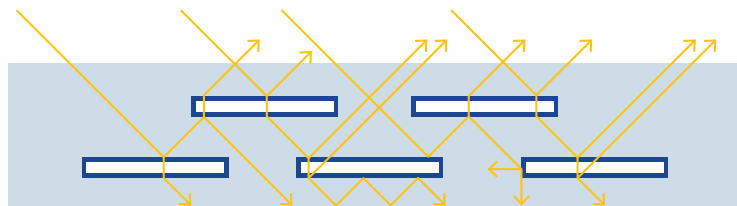
Screen printing thus allows for five times more color to be applied to the substrate than is possible by flexo printing.

## EFFECT PIGMENTS FOR SHIMMER OR SPARKLE

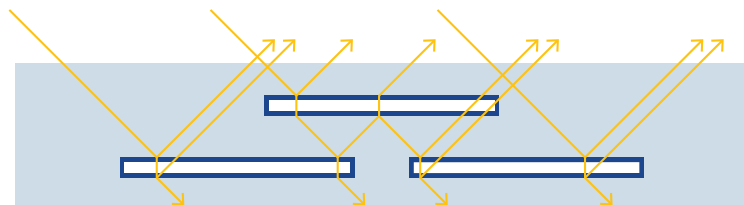
**KC 123**  
Smooth shimmering effect  
High hiding power  
Fine  
< 15  $\mu\text{m}$   
5 - 25  $\mu\text{m}$



**KC 103**  
Typical Pearlescent  
Medium hiding power  
Medium  
10 - 45  $\mu\text{m}$   
10 - 60  $\mu\text{m}$



**KC 153**  
Glittering effect  
Low hiding power  
Coarse  
< 100  $\mu\text{m}$



# OFFSET COATING

## Preparation of the coating

The ink should be free of sediment. For this reason, it should be stirred with a paddle mixer. A circulation system is recommended for printing inks used for larger print runs. The viscosity of the offset coating will need to be adjusted depending on the substrate, the speed of application and drying. Viscosities of 35–60 seconds (DIN 4 cup) are recommended.

## Printing substrate

The best effect pigments results are achieved with matte or smoothed substrates. The coarser and more absorbent the printing substrate is, the less noticeable the effect will be. We advise using a pigment concentration of 10–25%; glass flake-based pigments can also produce the desired glitter effect at concentration levels of 2–5%.

## Equipment configuration

The choice of the right anilox roller and photopolymer plate is critical for both trouble-free printing and for achieving a good effect:

Particle Size Effect Pigment	Pick-Up Volume Anilox Roller $\text{cm}^3/\text{m}^2$	Screen Angle	Lines/cm	Lines/Inches
<15 $\mu\text{m}$ 5–25 $\mu\text{m}$	6–13	60° or tri-helical	80–120	200–300
10–45 $\mu\text{m}$ 10–60 $\mu\text{m}$	9–20	60° or tri-helical	60–100	150–250
10–100 $\mu\text{m}$ 10–125 $\mu\text{m}$	20–25	60° or tri-helical	40–60	100–150
20–200 $\mu\text{m}$	28–32	60°	30–34	75–85

The cell geometry of the anilox roller should be calibrated to the pigment used in accordance with the table above. To avoid the halo effect, it is generally recommended to mount guide rails on the photopolymer plates.

Suitable photopolymer plates are:

- Nylocoat® Gold A116 – Flint Group
- Seal® F116 – Flint Group
- Cyrel® CL2 and CL4 – DuPont



# FLEXO PRINTING

## Preparation of the printing ink

The ink should be free of sediment. For this reason, it should be stirred with a paddle mixer. A circulation system is recommended for printing inks used for larger print runs. The viscosity of the flexo coating will need to be adjusted depending on the substrate, the speed of application and drying. Viscosities of 20–60 seconds (DIN 4 cup) are recommended.

## Printing substrate

The best effect pigments results are achieved with smoothed substrates and unstructured films. The coarser and more absorbent the printing substrate is, the less noticeable the effect will be. We advise using a pigment concentration of 10–25%; glass flake-based pigments can also produce the desired glitter effect at concentration levels of 2–5%.

## Equipment configuration

The choice of the right anilox roller and photopolymer plate is critical for both trouble-free printing and for achieving a good effect:

Particle Size Effect Pigment	Pick-Up Volume cm <sup>3</sup> /m <sup>2</sup>	Screen Angle	Lines/cm	Lines/Inches
<15 µm 5–25 µm	6–13	60°	80–120	200–300
10–45 µm 10–60 µm	9–20	60°	60–100	150–250
10–100 µm 10–125 µm	20–25	60°	40–60	100–150
20–200 µm	28–32	60°	30–34	75–85

The cell geometry of the anilox roller should be calibrated to the pigment used in accordance with the table above. To avoid the halo effect, it is generally recommended to mount guide rails on the photopolymer plates.

Suitable photopolymer plates are:

- Nyloflex® FAH – Flint Group
- Nyloflex® FAR – Flint Group
- Cyrel® PLS – DuPont
- Cyrel® HOF – DuPont

# GRAVURE PRINTING

## Preparation of the printing ink

The ink should be free of sediment. For this reason, it should be stirred well with a paddle mixer. A circulation system is recommended for printing inks used for larger print runs. The viscosity of the gravure coating will need to be adjusted depending on the substrate, the speed of application and drying. Viscosities of 15–25 seconds (DIN 4 cup) are recommended for solventborne systems. Viscosities for waterborne coating system should generally be set a little higher – up to 40 seconds are not uncommon.

## Printing substrate

The best effect pigments results are achieved with smoothed substrates and unstructured films. The coarser and more absorbent the printing substrate is, the less noticeable the effect will be. We advise using a pigment concentration of 10–25%; glass flake-based pigments can also produce the desired glitter effect at concentration levels of 2–5%.

## Equipment configuration

The choice of the right gravure cylinder is a decisive factor for both trouble-free printing and for achieving a good effect:

Particle Size Effect Pigment	Screen Lines/cm
<15 µm 5–25 µm	70 (to 60)*
10–45 µm 10–60 µm	60 (to 48)*
10–100 µm 10–125 µm	60–48 (to 32)*
20–200 µm	38–28 (to 24)*

\* Figures in brackets apply to wallpaper and decorative printing

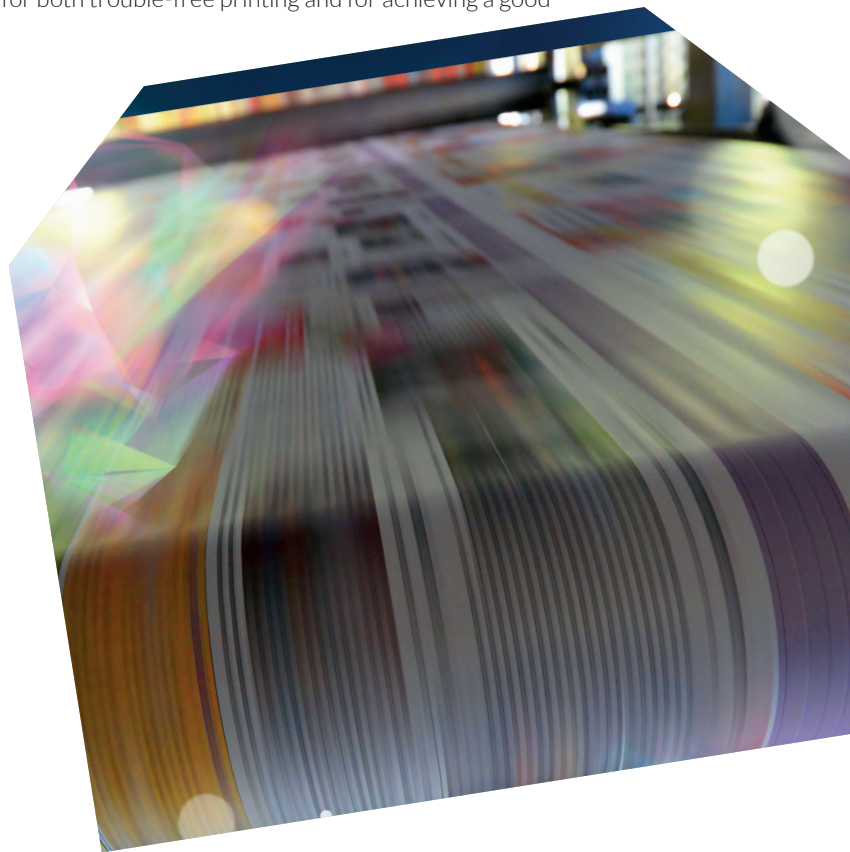
## Cell Geometry

### Engraved Cells:

- Aqueous printing systems: 130–140° piercing
- Solventborne printing systems: 120° piercing

### Etched cells:

- Cell/Screen ratio – min. 6:1, preferably 10:1
- Etching depth of 20 µm to max. 54 µm (for very coarse pigments: e.g. 20–200 µm an etching depth of up to 80 µm)



# SCREEN PRINTING

## Preparation of the printing ink

The ink should be free of sediment. For this reason, it should be stirred with a paddle mixer. The viscosity of the offset coating will need to be adjusted depending on the substrate, the speed of application and drying. For flatbed screen printing, a medium viscosity is recommended. It should be adjusted down for rotating screen printing.

## Printing substrate

The best effect pigments results are achieved with smoothed substrates and unstructured films. The coarser and more absorbent the printing substrate is, the less noticeable the effect will be. We advise using a pigment concentration of 5–15%; glass flake-based pigments can also produce the desired glitter effect at concentration levels of 1% or more.

## Equipment configuration

If you are using effect pigments, you should work with a monofilament screen mesh. As a rule of thumb, the mesh openings of the screen mesh must be at least 1.5 to 2.5 times larger than the maximum value of the particle size distribution of the pigment used.

A doctor blade with a hardness of 60° to 70° has also proved to be effective in use.

Particle Size Effect Pigment	Farbic No. L/cm (inch) / Filament	Mesh Size	Rotational Screen
< 15 µm 5–25 µm	165(420) - 34 TW or PW 150 (380) - 27 PW	23 µm 36 µm	SP 190 - 24% SP 160 - 27%
10–45 µm 10–60 µm	40 (103) - 80 PW	166 µm	SP130 - 33%
10–100 µm 10–125 µm	21 (54) - 140 PW	333 µm	SP 70 - 35 %
20–200 µm	21 (54) - 140 PW	333 µm	SP 40 50% / 38%







# PROCESSING

Finishes such as embossing, lamination, cellophane, as well as dispersion and UV coatings are all easy to carry out.

Overcoating with gloss or protective coatings (UV or aqueous) will increase the sparkle of the pigment used and give it a more even and smoother appearance.

Treatments with matte coatings will, on the other hand, reduce the effect. The extent will depend on the type and quantity of matting agent used.

Information on technical applications is provided to the best of our knowledge within the scope of the possibilities open to us but is without obligation. Current laws and regulations must be observed at all times. This also applies in respect of any protected rights of third parties.

Our suggestions do not relieve our customers of the need to test our products at their own responsibility to establish whether they are suitable for the intended purpose.

Quotations from our literature are only permitted after prior written authorization and only if the source is cited.

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**Fujian Kuncai Material Technology Co. Ltd.,**  
Haicheng Rd., Yuanhong Investment Zone, Fuqing,  
ZIP: 350314, China,  
T: +86 (0)591 8558 8067  
Mail: coco.ao@fjkuncai.com  
[www.fjkuncai.com](http://www.fjkuncai.com)

**Kuncai Americas LLC,**  
130 E. Wilson Bridge Rd Suite 210, Worthington,  
OH 43085, USA,  
T: +001 (0) 614-547-7424  
Mail: customerservice@kuncaius.com  
[www.kuncai-pigments.com](http://www.kuncai-pigments.com)

**Kuncai Europe B.V.**  
Linie 506, 7325 DZ Apeldoorn, The Netherlands,  
T: +31 (0) 55 21 00000  
Mail: info@kuncaieurope.com  
[www.kuncai-pigments.com](http://www.kuncai-pigments.com)

**Kuncai International India PVT. Ltd.,**  
No.04 Malbary Building, Plat no. TP-1, Ganeshwadi,  
Thane, India, ZIP: 400604,  
T: +91 (0) 222 5363 981  
Mail: kuncainternationalindia@gmail.com,  
[www.fjkuncai.com](http://www.fjkuncai.com)