



# CUSTOMISE YOUR COLOR

Kuncaï Effect Pigments  
for Plastics



## Customize your Color with Kuncai Effect Pigments

In an ever more colorful world, unique products have an increasingly hard time getting themselves noticed. Creatives are constantly seeking new ways to differentiate their products. The plastics sector offers a wide range of options to achieve this. The designers and, ultimately, also the brand owners, the plastics manufacturers and the plastics processors can choose from a whole host of base materials, color options, manufacturing procedures and surface structures to create memorable visual and haptic effects.

This information aims to give you an overview of the many and varied possibilities Kuncai effect pigments open up for your plastics products.

### Effect Design

Effect pigments give colors in plastic products an added dimension and depth. From a subtle pearl sheen to a mesmerizing metallic sparkle, such pigments help finishes 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 plastic, effects vary from silky matte to brilliant glitter. This also means that the finer the chosen pigment is, the opaquer the plastic will be. Conversely, the coarser the pigment, the more transparent the plastic will be.

# 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.

Our Product Lines: [KC Pearls](#), [Neomica](#), [SyaKarp](#)



## 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
- Perfectly suited for abrasion sensitive 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 plastics color and allows for greater color intensity.

Our Product Lines: [Chameleon](#), [Crystal](#), [Kyntaline](#), [Plovence Setallic](#), [XillaMaya](#)

## 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 plastics color. The products from these ranges furthermore add a lively sparkle to the final formulation.

Our Product Lines: [DinaStar](#), [Diamond](#)



## 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

# KUNCAI EFFECT PIGMENTS ARE GENERALLY SUITABLE FOR USE IN ALL KINDS OF PLASTICS

- Food Packaging (FDA) and even Toys (EN71).
- The pigments are physiologically harmless and do not migrate; therefore, they can be used in food packaging and also meet the European norm EN 71/part 3 for children's toys.
- The excellent temperature resistance up to well over 800°C makes them highly suitable for thermoplastics but they can also be applied in duroplastics.
- The more transparent the polymer, the better the effect.
- Suitable for Plastic Recycling.



# COLORING OF THERMOPLASTICS

## Preparation of the Coating

The final pearlescent effect of colored plastics depends on a range of different success factors. To achieve the best possible effects, please check out our recommendations for your application as indicated below.

- For best pigmentation results in use granulated color concentrates (masterbatch).
- A typical pearl luster masterbatch consists of 20-50% effect pigment in a medium comparable to the material of the final application.
- Dyes or color pigments can be added to adjust the final color.
- The screw geometry of the extruder should be adjusted so pigments are fully dispersed, but not too many pigment platelets are destroyed in the process.

## DIRECT PIGMENTATION

### ...with Granules

- Fixing the pigment on the plastic granules with the aid of 0.2% to 0.5% liquid coupling agents like softeners or highly refined mineral oils is recommended to avoid separation.
- Small particle-sized plastic granules (<3mm) promote a good pigment distribution.
- Suitable for injection molding compounds with relatively low viscosity up to a pigment content of about 2%.

### ...with Powder (PVC or Masterbatch)

- Mixing with tumble or high-speed mixer.
- In compounding PVC with high-speed mixers (dry blend), the mixing time should be kept as short as possible to avoid pigment damage.
- This can be managed by adding the pigments shortly before the end of the mixing time.

### ...with Liquid Color Concentrates (Injection Molding and PET Coloring)

- Settling of the pigment platelets must be taken into account.
- The formation of a solid sediment bed can be avoided by using thixotropic agents or pigment flocculation.
- Low pigment damage.



# HANDLING RECOMMENDATIONS

## Stretch Blow Molding

Due to the gentle heating of the blow molding process, the thermoplastic's elasticity is limited. Effect pigments are not malleable.

Stretching during the blow molding process creates voids between the polymer and the rigid effect pigments.

- The larger the effect pigments and the higher the stretching ratio, the more obvious are the voids.
- Effect pigments can be used at stretching ratios of up to 3:1.
- As the plastics is still in a semi-viscous state, 1-level or 1.5-level processes are more suitable.
- Void effects are also used to achieve the "frost effect" in PET bottles.

## Extrusion Blow Molding

Extrusion blow molding is a process for manufacturing hollow bodies. These can be round, angular, or oval and also have handles, as on the familiar detergent or drinking bottles. In contrast to injection stretch blow molding, extrusion blow molding is a continuous, one-level process.

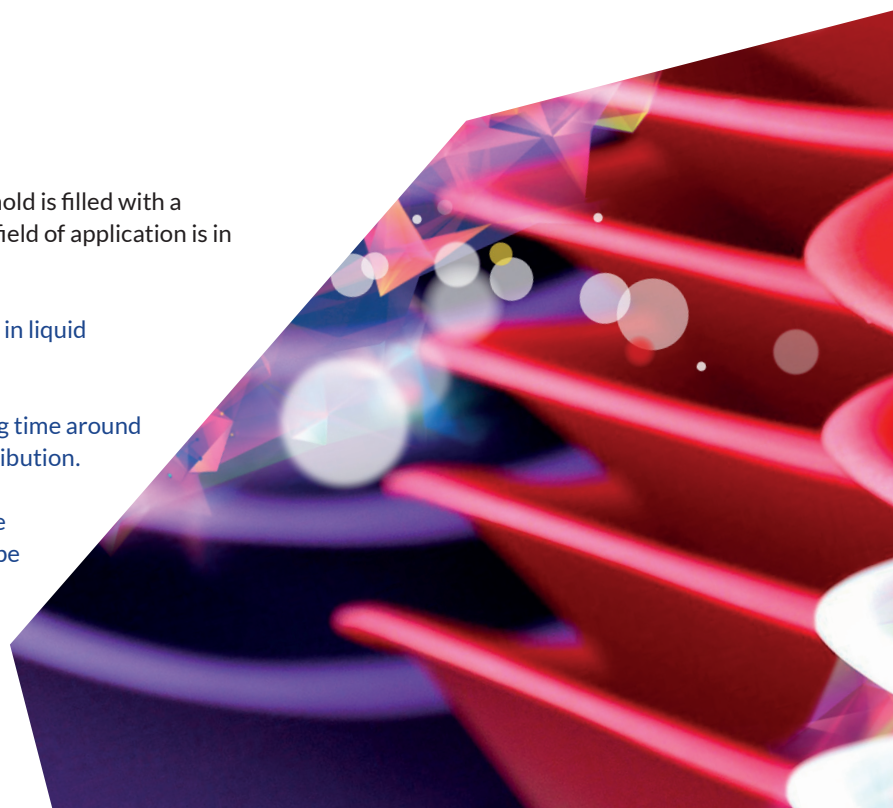
Polyolefins such as LDPE, HDPE, and PP are the most typical materials used.

- Effect pigments are well suited to the extrusion blow molding process, since the extrusion process guarantees that platelet-shaped effect pigments are aligned with the surface and show their full optical effect.
- This is an efficient option for combining high coverage with striking effects.
- Strong pearl luster and other effects can be achieved with a thin outer layer, while the desired opacity is created by the inner layer.

## Resin Casting

Resin casting is a method of plastic casting where a mold is filled with a liquid synthetic resin, which then hardens. The main field of application is in unsaturated polyester resins and PMMA cast resins.

- Kuncai effect pigments are easy to disperse in liquid casting resins simply by stirring.
- Depending on the size of the batch, a stirring time around 10 mins gives a homogeneous pigment distribution.
- To prevent air from becoming trapped in the mixture, the effect pigments powder should be prewetted with an appropriate solvent.



# HANDLING RECOMMENDATIONS

## Extrusion and Co-Extrusion

Extrusion is a very important step in the manufacture of blow molded objects, films, sheets, plates, tubes and profiles. It has the function of melting and homogenizing the plastic and also building up pressure and ejecting the material into the molding units. Films, foils, and plates are extruded through flat nozzles. Nozzles with larger openings are used for solid rods, tubes, or flat profiles. Irregular shapes such as angled profiles, for example L or T shapes, and complex shapes like window profiles can also be manufactured using an extrusion process.

Masterbatches or compounds are used to color the molten mass with effect pigments.

Co-extrusion is used to combine different materials or the same materials with different colors or effects. The two materials are combined into one flow in the co-extrusion die.

- The use of effect pigments in the surface layer ensures a good effect strength and offers cost benefits due to the perfect orientation of the effect pigments on the visible surface.
- Due to the much thinner co-extrusion layer, a higher concentration of effect pigments must be used than in regular extrusion.
- A lower concentration of pigments is needed when the entire layer mass is colored.
- The inner layer in co-extrusion usually uses high coverage. Normally no effect pigments are used here.

## Injection Molding

Injection molding is the most commonly used manufacturing process for the fabrication of plastic parts. A wide variety of products are made using this technology. They vary greatly in their size, complexity, and application. The plastic is first melted and then injected into the mold, where it cools and solidifies into the final part. The most challenging aspect of employing effect pigments in injection molding is the avoidance of flow or weld lines in the end product.

Tips for avoiding flow lines :

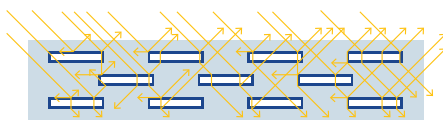
- Ensure well-engineered tool construction so effect pigments can orient perfectly to avoid flow lines or welding effects.
- Optimize the position of the injection gate.
- Circular, centralized, and edge-minimized forms are suitable for effect pigments.
- If the above are not possible, we recommend highly transparent effect pigments in low concentrations, like our Diamond or DinaStar series.



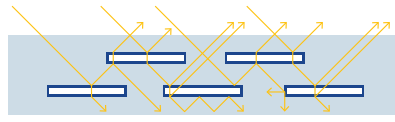
# INFLUENCES ON THE EFFECT

Kuncai effect pigments can be used in nearly all plastics processes. Owing to the physical properties of the pigments, the following applies to all the various processing systems used:

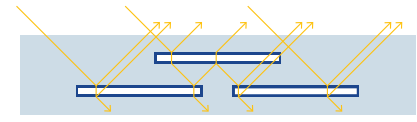
- The thicker the effect pigment plastic layer colored with effect pigment, the stronger the effect
- The higher the pigment concentration in the plastic, the stronger the effect
- The effect varies strongly depending on the effect pigment chosen, from silky to sparkling



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

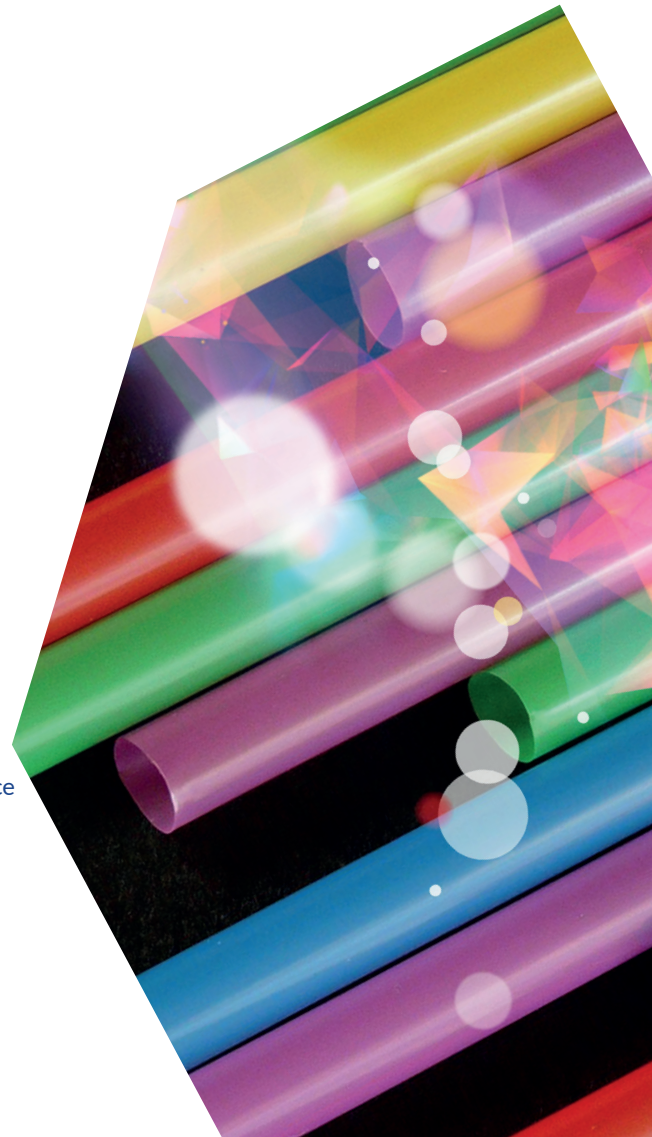


Typical Pearlescent  
Medium hiding power  
Medium  
10 - 45  $\mu\text{m}$   
10 - 60  $\mu\text{m}$



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

- The more transparent the plastic, the greater the:
  - » Brilliance
  - » Effect strength
  - » Tinting strength
  - » Color clarity
- The use of even surfaces increases the intensity of the effect
- To prevent pigment damage in the production process
  - » Apply low shear forces in the extruder and mixers
  - » Reduce pressure and speed
- To achieve homogenous distribution of the platelets
  - » Ensure good mixing or prewetting of the pigments
- For good orientation of the pigment platelets in the carrier polymer
  - » Make sure the pigments platelets are horizontal to the surface







# KUNCAI PRODUCT RANGES

## for Plastics Applications

### MONO PIGMENT CONCENTRATES

Mono-concentrates (MPCs) are intermediates for the production of master-batches and compounds. They are concentrates with a high loading of inorganic effect pigments dispersed in a defined carrier resin, which allow for easy processing into final masterbatches or compounds.

Kuncaï's mono-concentrates contain a high concentration of a single effect pigment (60 – 80%), dispersed in a carrier resin\* with a pellet size of 1 mm to 3 mm.


#### Product Features:

- Dust free operation
- High production efficiency with minimal wastage
- Reduced cleaning between batches
- Fast color changes in the extruder
- Flexible color styling possibilities
- Very good effect pigment dispersion and distribution in the final masterbatch or compound
- Lower shear forces needed during incorporation
- Excellent effect intensity

Our MPCs are available in all major effect color tones:

- Silver White
- Interference colors
- Gold
- Copper
- Chameleon (Multicolor)

Polyolefin (PE) or universal carrier (e.g., for application in PS, ABS, PTE other carrier resins could be also customized).



# KUNCAI PRODUCT RANGES

## for Plastics Applications

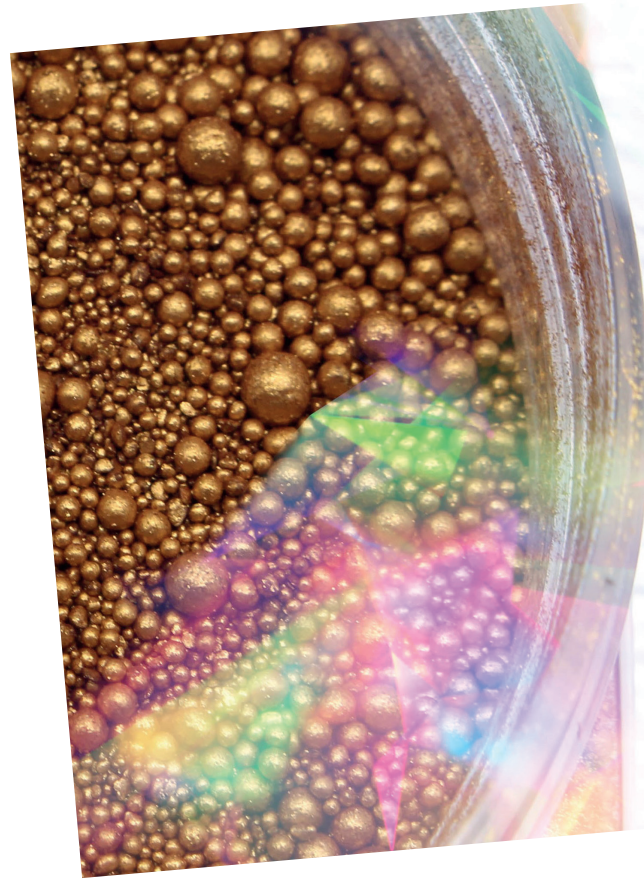
### WM-PIGMENT PREPARATION WITH WAX

Our WM 10 effect pigment preparations contain 70% KC Pearls and 30% PE wax. This product series offers masterbatch manufacturers in particular a number of benefits that allow them to shorten production times and increase productivity.

#### Product Features:

- Reduced dusting compared to powder pigment form
- Better flow in the feeder compared to powder pigment form
- Higher throughput in the extrusion process
- Fully dispersible with ease during mixing with the polymer matrix
- Fast color changes in the extruder
- Good effect pigment dispersion and distribution in the final masterbatch or compound

Most of our standard grades are available as WM grade, volume dependent.



### KU-ANTI YELLOWING GRADES

These grades are especially treated to ensure non-yellowing in plastics after UV exposure. The following KU grades are available:

- KC100KU
- KC103KU
- KC111KU
- KC119KU
- KC123KU

All grades have been officially approved by L'Oréal (statement is available).

# KUNCAI PRODUCT RANGES

## for Plastics Applications

### WR - FOR OUTDOOR PLASTICS APPLICATIONS

The quality requirements for exterior applications are considerably higher than for indoor applications. For these purposes, Kuncai therefore offers weather-resistant versions of most of its standard pigment ranges. An additional finishing layer on the pigment itself ensures outstanding weather resistance for all external applications.

Kuncai weatherproof pigments used in outdoor applications also come with particular specifications, such as a narrower particle-size distribution and overall smaller particle size and a tighter color tolerance.

Our weather resistant effect pigments series comply with the standard testing procedure DIN EN ISO 6270-2 for humidity resistance and SAE J 2527 for accelerated weathering.

#### Product Features:

- Final coating of the effect pigment with chromium hydroxide
- Excellent UV yellowing resistance
- Extremely high temperature resistance
- High humidity resistance
- Suitable for outdoor plastics applications due to excellent weather resistance properties
- Suitable for interior applications due to outstanding humidity resistance and UV resistance properties for demanding application surroundings.

Kuncai also recommends the use of weather resistant pigments for interior applications which need to meet higher product performance requirements such as humidity or UV light resistance. Typical examples for this type of application are furniture, bathroom or kitchen interiors which are exposed to moisture or splashing water.



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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