

Powder Coatings

In powder coating formulations, the chemist has a choice of evaluating Bead Brite products either as post additional material or as an ingredient to be extruded with the pre mix. Visual appearance differences are based on the level and process used. For example, the extrusion process has the effect of melt encapsulating the Bead Brite additive leading to a reduction of their visual contrasting properties. At concentrations above 5%, the glass additive tend to lower gloss dramatically as they begin to induce surface texture and turbidity. Depending upon the formulation, improvements in flow with the glass additives are noticed at levels below 3%. The formulating chemist must subject all formulations to performance testing.

Formulation of Bead Brite and Helicone in Powder Coating Applications

The same basic principles with respect to the optics, compatibility, and physical properties of the Helicone pigments apply to powder coatings as they do liquid. Helicone liquid crystal pigments are stable up to 300' C, therefore, processing temperatures encountered during the extrusion process are not a concern. As in liquid coatings, similar dramatic color transition and unique depth of image appearance can be generated using the same basic formulation practices.

A truly unique, versatile and outstanding feature of the Helicone pigments in comparison to standard effect pigments is the fact that they can be incorporated directly into the melt mix, extruded and ground into finished powder. This fact obviously has major cost reduction, and application implications. This feature is unique to Helicone pigments and offers the powder-coating chemist an unparalleled formulating ingredient.

Helicones can be easily incorporated in powder coating by using the following processes:

- Extrusion
- Bonding with Finished Powder
- Post Adding or Dry Blending with Finished Powder
- Dry Blending with Extruded Chips and Co-Grinding

Typical use levels are 0.5-5% by weight in the formula. The only limiting factors are the desired color transition, brilliance, sparkle and appearance of the finished coating. A suggested starting point in most formulations is to begin working at a 2% level and working up or down from this level.

Using Bead Brite Additives with Helicone Color Transition Pigment

Bead Brite additives can be used in a similar fashion as they are in liquid coating systems. They help impart depth of image, act as optical spacers, and can improve flow, leveling and physical properties of the cured film. Most importantly when used properly they help reduce total cost contribution of the more expensive color effect pigments.

A good starting point use level is to consider 3% or less of Bead Brite additives in powder coating formulations. Loading levels of Bead Brite additives either singly, or cumulatively in combination with other Bead Brite additives must not exceed 5% based on total formula weight. Beyond this level, they begin to detract from the gloss, clarity and distinctness of image of the film and affect the sparkle of Helicone liquid crystal pigments. It is extremely important, therefore, to determine the right loading for the individual color with which they are used. If extenders and fillers are used in conjunction with the Bead Brite additives, the total amount of extender plus Bead Brite additives should not exceed 5% by weight of total formulation.

Two modes of adding Bead Brite additives to powder coatings are via extrusion or post addition. Post addition of Bead Brite additives can be accomplished via dry blending with the finished powder or it can be co-ground with extruded chips. Extruding the Bead Brite additives tends to obscure their reflective properties. It is important to note therefore, that the visual effect contribution of Bead Brite additives is process and level dependant.

It should also be emphasized that Bead Brite additives are "Dependency Enhancers". That is, they will perform differently with respect to appearance and color modification depending on the color in which they are incorporated and the level and process used for their addition, that is, either post-added or extruded.

Beyond seeking stunning visual effects, a prudent formulator must check to make sure that the cured film properties of his formulations meet the desired performance properties for which the coating is intended. As with most pigments, the proper selection of UV stabilizers is critical to the exterior weathering performance

of Helicone pigments.

It is necessary to utilize materials, which provide protection in the UV-A range in order to achieve long-term color stability.