

Facts about Ink Pigment Particle Size

As illustrated below and described in the following technical notes, there is a correlation between particle size and some important parameters of a pigment dispersion.

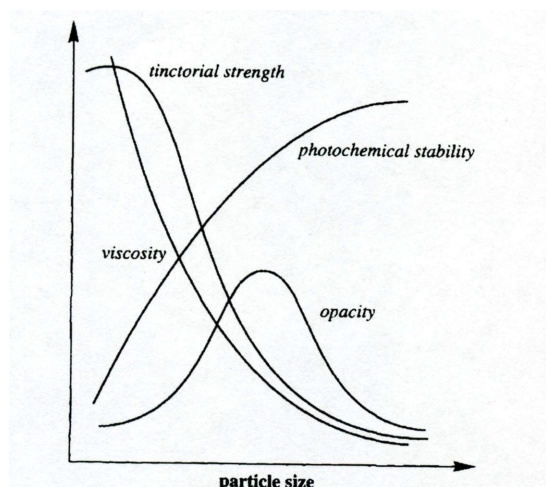


FIG - Dependence of some pigment performance parameters on particle size

The crystal size of a pigment has an important effect on the ink's color strength, opacity/transparency, photochemical and thermal stability and viscosity. Color strength increases, in general, as mean particle size decreases. This has been firmly established by theoretical elaborations, experimental confirmation and practical usage. The highest dependence is found to occur at $\leq 0.1\mu\text{m}$. The shade of a dispersion can be affected to a certain extent by a reduction of pigment particle size. An example of this is C.I. Pigment Yellow 34 which becomes greener as the size is reduced. Another important aspect is size distribution. In general, a wide particle size distribution results in lower color strength and dullness or dirtiness in shade.

The opacity/transparency of a dispersion is affected by particle size and size distribution of the pigment. Thus, in a given medium, there is a maximum in opacity at mean particle size ($0.2\text{--}0.5\mu\text{m}$). Opacity at a given size is greater the narrower the size distribution. Similarly, the transparency of a pigment-vehicle system is also dependent upon particle size. A high degree of transparency is an essential requirement of inks for the printing industry, and of paints for special effects (metallic, pearlescent etc) In such applications pigments with very small particle sizes are used.

Excerpted from - "Some aspects of organic pigments"
Ciba Specialty Chemicals, Pigments Division,
Marly, Switzerland.