



## INTERNATIONAL MARKETING, INC. TECHNICAL BULLETIN

**SUBJECT: Powder Coating Material Characteristics Defined**

**DATE: November 2005**

---

### Powder Coating Material Characteristics Defined

#### Chemistry:

- Chemistry is important in maximizing the physical and chemical properties for the product in its environment. In the case of truck wheels, a polyester resin is important to maximize performance to outdoor exposure. Selection of the appropriate Polyester resin and cross linker system is important to maximize UV weathering, surface adhesion, impact resistance, chemical resistance, and salt spray performance. **Is it the right coating for its environment?**

#### Specific Gravity:

- Specific gravity provides a direct correlation with the amount of substrate coated with a specified mil thickness. Lower specific gravity materials will cover more square footage of substrate per pound of coating given the same mil thickness. Pigments play a major factor in the specific gravity of the powder. Therefore, specific gravity comparisons are meaningful only when comparing products of the same color family. **Will the product yield the most production parts?**

#### Film Thickness:

- A film thickness recommendation for a specific powder is based upon the ability of the powder to flow out and form a smooth continuous film. The film thickness specification is also based upon the hiding power of the product. Powders can vary in their ability to provide satisfactory coverage at very low mil thickness specifications based upon the amount and type of resin, cure and filler materials formulated into the material. Pigment concentrations levels and the type of color play a very important role in the minimum film thickness. Products which are high chroma colors (such as yellows, reds and oranges) will require higher mils to hide the substrate. The amount of mils needed can be reduced based upon the concentration of pigment in the formula. When considering a film thickness application range for a truck wheel, one should be able to get high quality products which will provide good flow out, hiding, and salt spray performance at 2.0-3.0 mils. **Will the product provide superior performance at low mil thickness?**

### Film Build:

- Film Build of a product is ability to charge and be attracted to the substrate. The better quality powders will quickly build film resulting in less overspray. This test for “film build” consists of putting panels into a booth set up with an automatic spray gun. Two passes are made with the product and the mil buildup on the panel is measured. Mil buildup is another property which is sensitive to pigments. Calculation is dividing the mil buildup of standard versus the mil buildup of competitive material. **How much product do I spray through my gun until the proper mil thickness is achieved?**

### Transfer Efficiency:

- Transfer Efficiency is another measure of the product’s ability to be attracted to the substrate. Transfer efficiency is a combination of the resin’s charging ability and the particle size distribution of the product. Typically, products with smaller particle size are harder to charge because there are fewer locations on the particle to form a charge. However, too large of a particle size will produce a rough orange peel resulting in a coating which is not very smooth. Therefore, products are manufactured with a target average particle size, and quantified with the maximum allowable volume of particles below 10 microns. **Will there be more of product on my part than on the operator, floors and walls?**

### Anti-Out Gassing:

- Anti-Out Gassing additives are built into the premium quality formulations to reduce voids in the film from surface imperfections out gassing when exposed to heat during the cure process. These voids will lead to rust when the wheel is exposed to the outdoor environment. **Is the product I’ve chosen designed for my application?**

### Direct/Reverse Impact Resistance:

- This characteristic measures the ability of chemistry to withstand a driving force measured in inch pounds. The resin and curing system will determine the impact properties of the chemistry. Performance in the field for impact can be directly affected by under cure or over cure of the powder. This characteristic refers to the ability of the product in its cured coating form to withstand a 140 pound impact. This characteristic is very important for wheel coatings to withstand the impact of foreign objects on a coating which is being weathered in a very aggressive environment. **Does the coating have significant resistance to the impact of foreign objects?**

Coverage Square Foot/lbs:

- The amount of substrate coverage per a pound of powder is a mathematical calculation that includes the entire set of product characteristics discussed above. A theoretical coverage can be calculated for the product. This theoretical calculation can be confirmed by actually testing the product on line. Actual coverage versus theoretical will be affected by the condition of the line, gun set up and applicator ability. **Is my system adjusted to get the most out of my product?**

$$\text{Coverage (Sq. ft./lb.)} = \frac{(192.3 \times \text{Film Build})}{(\text{Specific Gravity} \times \text{Film Thickness})}$$

**Questions regarding the above technical bulletin may be directed to:**

**INTERNATIONAL MARKETING, INC.**  
25 Penncraft Avenue, Suite C  
Chambersburg, Pennsylvania 17201  
Toll Free: 800-233-7086  
E-mail: [imi@imiproducts.net](mailto:imi@imiproducts.net)  
Web Site: [www.imiproducts.com](http://www.imiproducts.com)