

### Background

Aluminum metallic, gold bronze metallic, or effect flakes are used to achieve metallic, sparkle, luster, or pearl appearances in coatings. During the curing process, the flake orients itself parallel to the surface of the coating to provide the desired appearance. Flakes can be designed for different orientations in the film or on the surface of the coating to provide a range of appearances from sparkle to chrome effect. Since all metallic and effect pigments migrate to some degree on the surface of the coating, they are susceptible to environmental influences. Abrasion and chemical resistance are two important properties that should be considered when selecting a special effect coating.

### Chemical Resistance

#### Definition

Chemical resistance is the aptitude of a coating to resist an attack from an aqueous medium applied to the surface of a coating.

#### Discussion

Metal flakes can react with chemicals such as water or cleaning agents (alkaline or acidic), which darken the appearance of the coating. Sparkle finishes with the metal more “hidden” in the coating are better for chemical resistance than the chrome appearances where the metallic pigment is highly concentrated on the surface. A clear coat over a metallic finish can be used to protect metallic pigments from moisture and cleaning agents.

Non-metallic effect pigments have dramatically better chemical resistance. However, there are limitations on the appearances that can be achieved with non-metallic effect pigments.

### Abrasion Resistance

#### Definition

Abrasion resistance is the aptitude of a coating to resist marring or abrasion, or can also describe the visual change due to the scuffing and erosion of the surface of the coating.

#### Discussion

All effect coatings will be affected by abrasion. Coatings with aluminum flakes will darken. Effect pigments close to the surface will be removed, allowing more base color to show through, which changes the appearance. The abrasion can occur in the shipping process or in normal use of a painted surface. All effect coatings, which will be used in areas where abrasion will occur, MUST have a clear coat applied over the base coat to prevent changes. This includes but is not limited to: handrails, office furniture, hand held devices, tools, and cabinets.

### Conclusion

Coatings with metallic pigments are susceptible to visual degradation due to the environment they are used in. There are some applications suitable for metallic coating without clear, such as interiors. However, testing should be conducted that validates the coating performance expected before use. A clear coat is recommended over all effect coatings for the best protection against chemicals and abrasion.