



## UV Coatings and Pigment Bleeding

It is well known among experienced users of UV curable products that some incompatibility may exist between certain coatings and inks. Specifically, users have experienced “bleeding” “burn-out” or “fading” of inks that contain certain alkali-sensitive pigments which have been overprinted with UV or water base coatings.

The problematic interaction typically occurs when an alkali-sensitive pigment such as Rhodamine Red, Rubine Red or Reflex Blue comes in contact with alkali materials that contain specific functionality. These alkali materials may be found in many UV/EB curable, water base and some solvent base coatings. The result of this chemical interaction is a change in color of the pigment. Reds will change to orange hues and blues may be left colorless. It is important to recognize that pH is not an indicator of the potential of these systems to change color; rather it is specific alkali functionality that is the catalyst.

Formulations of UV curable inks, coatings and adhesives vary widely in the selection of raw materials used. The photoinitiator package used in a UV formulation is a key element in performance characteristics and overall coat of the product. Photoinitiators are typically the highest coat raw material in a UV product. To provide better economy, other lower cost synergists may be used to provide performance. Some of these, however, have the ability to react with the pigments mentioned previously and a color change may take place.

Experienced ink and coating formulators are aware of these reactions. It is highly recommended that before any changes are made to successful systems, the formulators be contacted to investigate this possibility.

Two solutions can be offered. The ink manufacturer can provide correctly tinted ink without the use of Rhodamine Red, Rubine Red or Reflex Blue, or the coating supplier can modify the overprint formula to eliminate the synergist that causes the problem. Typically, either solution will result in increased costs.

Compatibility testing prior to production or trial runs is recommended. The following procedure may be used with confidence:

1. Rollout or drawdown a sample of the inks to be used on the job. Do not cure or intentionally dry.
2. Immediately place a puddle of the coating or adhesive to be used over the wet ink. Do not cure or intentionally dry.
3. Place the test sample in an oven at  $140^{\circ}\text{F} \pm 20^{\circ}\text{F}$  for one hour.
4. Observe the test specimen every 5 to 10 minutes. Record color change if any. If color change is evident, this system is considered to be incompatible. Be aware of the difference between color change and a condition of solubility. The puddle solution may have solubilized the ink and floated the pigmentation to the outer edge. This is not a problem as long as the hue of the pigment has remained constant.
5. If no change in hue has been observed after one hour, additional observations may be reduced to intermittent for the next 24 hours.
6. After 24 hours a determination may be made as to the compatibility of the system.

Northwest Coatings' laboratory is adept at testing for these problems and offering solutions. Please contact us if you need assistance.

