

## **Problem**

The aqueous coated PMS or special match colors exhibit a visual color-shift to a more yellow or brown hue soon after printing and standing captive in the press loads.

## **Description**

Ink pigment burnout or color-shift can sometimes occur when the printed ink film is over-coated with aqueous, or in some cases, UV coating.

This burnout affect, which causes an unacceptable color-shift, is a chemical reaction due to pH incompatibilities between the alkaline aqueous coating and certain alkaline sensitive ink pigments. Weakly pigmented tint solids, particularly pinks and blue shades, are most susceptible to color-shift due to this undesirable chemical reaction, which basically changes the way certain color pigments reflect light. Individual press pull-sheets or top-sheets in the pile are rarely as affected as the sheets captive in the press loads, indicating that heat and oxygen deprivation are contributing factors in accentuating, or at least accelerating, the color-shift effect.

What makes this problem particularly insidious is that the color-shift may not be apparent immediately off press. Sometimes the negative effect can take 24 hours or longer to be noticeable.

There are many inherent variables in the print/coat process, such as substrate holdout and surface alkalinity, ink formulation, ink film density, ink water pick-up, fountain solution acidity, coating formulation, heat, dry speed, and ambient environment. However, the primary factor causing ink pigment burn-out is the incompatibility between certain non-alkali resist ink pigments and highly alkaline aqueous coating formulations reacting with the captive heat in the printed load.

## **Causes**

- Inks formulated with certain non-alkali-resist ink pigments including:
  - Rhodamine Red
  - Purple
  - Reflex Blue
  - Warm Red
  - Violet
  - 072 blue
  - Rubine Red
  - Florescent pigments or pastel inks
- High-alkaline or high-amine (ammonia hydroxide) aqueous coating formulations.
- Captive printed sheets subject to high heat, oxygen deprivation, and pressure within the printed load.

## **Ink Pigment Burnout (continued)**

### **Options and Solutions**

- Formulate PMS and special match colors with alkali/fade-resistant pigments.

#### **Alkali Sensitive Pigments**

Rhodamine Red - (Y.S. Rhodamine Red)

Purple - (B.S. Rhodamine Red)

Reflex Blue - (Alkali Blue)

Warm Red - (Red Lake C)

Violet - (Methyl Violet)

072 Blue

Rubine Red - (Lithol Rubine)

Fluorescent pigments / Pastels

#### **Alkali Resistant Alternatives**

Quinacridone Red

Carbazole Violet & Quinacridone Red

Carbazole Violet & Phthalo Blue

Y.S. Naphthol Red / Y.S. 2B Red

Carbazole Violet & Phthalo Blue

Carbazole Violet & Phthalo Blue

B.S. 2B Red

Consult with ink supplier

- Change to a low-amine or heat-resistant aqueous coating with as low a pH as possible (less alkaline). Consult with supplier.
- Advise ink supplier of the need for alkali or fade resistant inks compatible with aqueous or UV coating.
- Pre-test sensitive colors, especially tint solids and screens, by wet-trapping half the image with aqueous coating and then expose both samples to a high-heat source such as a heated saddle dryer.

To best simulate actual production with ink and fountain solution, on-press testing is recommended. For side-by-side comparison, cut the coater blanket packing half-way through the printed ink film to be tested.

Apply the coated and uncoated print samples to a heated dryer saddle immediately off press. Burnout and color-shift usually occurs during heat application.

If time permits, wait 24 hours, reapply heat, and again compare the color integrity of the samples.

- Wind the printed loads as soon as possible to reduce unnecessary exposure to high heat builds captive in the pile.