Technical Notes

NANCY PLOWMAN ASSOCIATES, INC.

www.npatest.com

Water Sensitivity Mottle

BTM is found in multicolor process jobs that contain large area of cyan and magenta coverage, such as blue skies, and because of how it occurs, requires multiple printing units. This type of mottle is seen in the inks that are printed in the first units on press; the last unit cannot have BTM.

Another type of mottle that seems to be increasing in frequency is a broken print caused when ink and fountain solution (now referred to as "water") cannot fully transfer to the paper's surface. We call this *water sensitivity mottle*

During printing, water is transferred to the paper's surface before the ink. This is true in both the image and nonimage areas since:

In the **image area** a thin film of water is carried on the outside of the printing dots which transfers ahead of the ink. Therefore, water sensitivity mottle can occur in a single color press.

In the **nonimage area** a thin film of water is printed onto the sheet from the blanket. Therefore water sensitivity mottle can occur in the last units of a multiple unit press.

The surface of coated paper must have the capability to accept the water, allow it to penetrate, and immediately accept the ink film. Paper coatings are formulated with two main ingredients: **pigments** and **adhesives**.

Pigments such as clay, calcium carbonate, and titanium dioxide have different sizes and shapes that cover or "coat" the fibers of the paper stock. These ingredients enable the paper maker to design a coating with a "pore structure" that allows materials (such as fountain solutions and ink solvents) to pass into the coating layer.

The adhesives, which are mostly synthetic, bind the coating to the paper fiber stock, and give the coating the internal strength required for good wet and dry pick resistance during printing.

The combination of adhesives and pigments (along with several additives) has a dramatic effect on the water receptivity of the coated paper surface. In the lab, we characterize papers in three levels of printability:

High water receptivity: In some coated papers, the surface coating accepts the fountain solution too quickly. As it does, the coating materials break down and actually break loose from the paper's surface, pile onto the blankets, and can contaminate the fountain solution on press.

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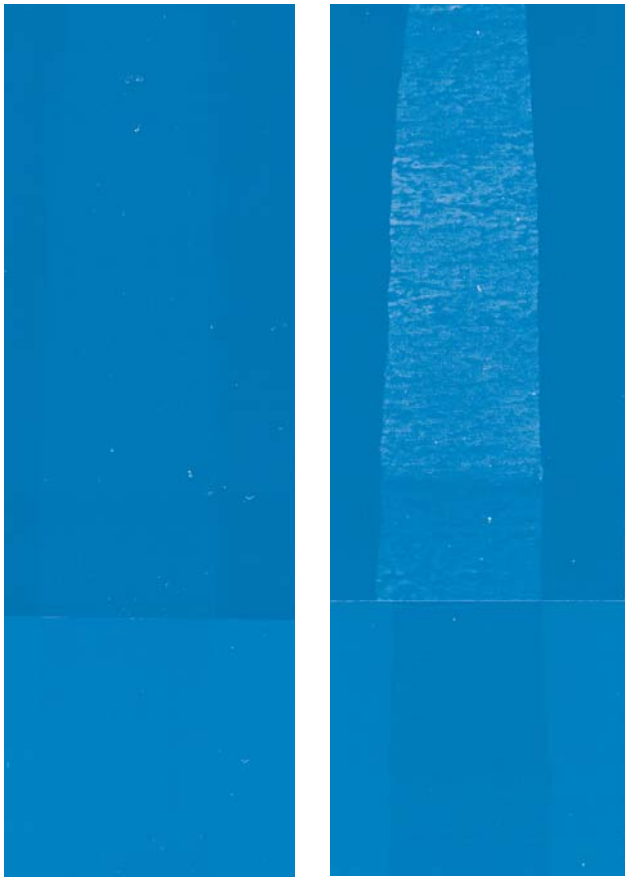
Good water receptivity: The majority of papers fall into this category. These sheets allow the water to penetrate, and then simultaneously accept ink films resulting in sharp printed dots.

Poor water receptivity: The surface of some coated papers is so "tight" that the sheet does not allow any water to penetrate. A very thin film of water is held up on the surface and prevents the ink from transferring. We have found that this low penetration rate is independent of the paper's absorption to ink solvent. In the lab we can test for the water sensitivity mottle of a coating. During this test we introduce both the ink and the fountain solution used on the job to the paper using our TestPress. By using this test, we can predict what will occur on press. This work is used in stock selection, as well as formulation of paper coatings for offset printing.

Water Sensitivity Lab Prints



Good Bad