

Technical Notes

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Printing Successfully on Uncoated Papers

Many printers use their “regular” inks on uncoated papers, and can sometimes be successful. Our recommendation for VOC-Free inks, is to assure that each job will set and dry properly.

Here is why:

Uncoated papers do not have the layer on material on the surface called “coating”. Coating is chemically similar to latex based house paint. It contains pigments (to cover the fibers and make a smooth surface) and binders, usually synthetic (to bind the pigments to the paper base stock).

Coated paper is more forgiving to the type of ink used on it, since coating materials have the capability of absorbing ink oils, and starting the setting function of quick set inks. Coating also moderately effective at absorbing fountain solution. Of course there is a wide range of coated paper properties, and they should be screened before running any printing job.

Uncoated paper, on the other hand has a surface that is primarily cellulose fibers. These fibers are water loving, and therefore absorb fountain easily on press, and they do this more efficiently than coated papers.

Uncoated paper fibers create a “rough” surface that requires thicker ink films than on coated papers for complete ink coverage and good density. This property is usually interpreted by the printer as absorbency, but is really a result of increased surface area that must be covered with the ink film, compared to a sheet that is coated.

Uncoated paper fibers cannot absorb ink oil, so they cannot initiate the “setting” function of the ink. We have to consider uncoated papers as non-absorbent substrates to ink. Like plastic, it is not capable of pulling the thing oils from a quick set ink.

It follows therefore: inks which set and dry by absorption will take extremely long times to become set and eventually dry on an uncoated stock. These are formulations containing volatile oils and will scuff and mark for a very long period of time.

Inks that contain oxidation oils, which dry by exposure to oxygen (not by absorption) are needed for all non-absorbent stocks, including uncoated papers. Once applied to the uncoated paper stock, these inks require minimal absorption to set, and will eventually completely dry through oxidation.

UV curable inks print and then harden when exposed to UV light. They work well on either uncoated or coated papers. These inks are VOC-free.

An explanation of volatile versus non-volatile inks.

There are two basic categories of oils used to manufacture offset inks; vegetable oils and hydrocarbon solvent oils.

NON-VOLATILE OILS: Vegetable oils do not evaporate in ambient (pressroom) conditions, which would classify them as non-volatile. Oils like tung, linseed, soy, china wood, etc are commonly used in oxidative ink formulations. These oils do not seek to dry through absorption, so they are the primary oil used for non absorbent substrates, such as plastics, metals, foils, film, and uncoated substrates. Vegetable oils should not be formulated into web ink formulations, since their boiling points are above the web oven temperatures, and they will smoke and precipitate out in the ovens.

VOLATILE OILS: A good example of a volatile material that evaporates quickly in ambient conditions is isopropyl alcohol. Ink oils can be Hydrocarbon solvent oils, which are in the solvent family of deodorized kerosene and are used in quick set ink formulas for formulation reasons. Depending on the ink, they can be found at levels from 5% (if blended with vegetable oils, to 40+. These oils evaporate slowly in ambient conditions but depend on absorption into the printing stock to minimize the amounts that must evaporate. These oils can be flashed off in a web oven, since their boiling points range from 400-600°F.

NOTE: Most inks today are a blend of different oils.