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IT CAN'T ALWAYS BE UV...

Advantages of UV curing printing inks are well-known and appreciated by printers. There are no volatile solvents, no premature drying in the screen, instant further processing and many more. Even in face of all recent innovations achieved in the field of UV-curing, such as UV-LED curing, we should not neglect the technical possibilities of conventional solvent based printing inks. In the meantime this technology has also experienced quite a few technical advancements. Indeed, solvent based ink systems may have some advantages over UV-inks. Conditioned by the volatile components contained in solvent based inks the dry ink film is usually only 1/3 of the wet ink film, whereas the dry film of UV inks is not much different than that of the wet film. For tactile structures, such as Braille UV prints are best choice, but sometimes printers want to achieve the contrary. Also extremely mat surfaces or soft-touch effects can be achieved a lot easier using solvent based systems. Environmental aspects such as solvent emissions are mitigated when applying small amounts of ink as is the case with pad printing applications. One can never make a blanket assessment which system is better as this always depends on the individual application.

Our experiences with **K-NIR Drying** have shown that very quick further processing can also be achieved with solvent based ink systems.

WHAT IS K-NIR?

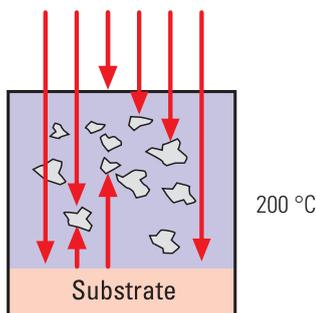
K-NIR is a part of the wave length spectrum of the infrared range, which is directly attached to the visible range of light. Infrared radiation is split in various ranges, near-infrared, medium-infrared and far-infrared. Near-infrared again is divided in IR-A range with a spectrum of 780 nm to 1400 nm and IR-B ranging from 1400 nm to 3000. Mainly the shorter wavelengths penetrate well into materials. In addition absorption (depending on material) plays an important role. The K-NIR spectrum comprises the complete IR-A spectrum with additional shares of IR-B of up to 1500 nm.

K-NIR Technology

Effect

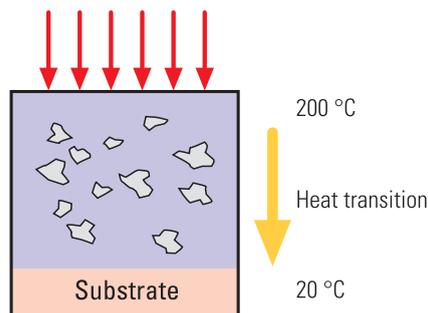
K-NIR

Quick heating of volumes
Internal reflection of radiation



"Low Bake" Convection IR

Heating of surface



HOW DOES K-NIR WORK?

K-NIR penetrates deeply into the substrate and causes a direct and strong temperature rise in the printing ink film reaching the substrate. With conventional heat drying there is a gradual heat transition from the surface to the substrate.

TRIALS CARRIED OUT AT COATES SCREEN INKS GMBH

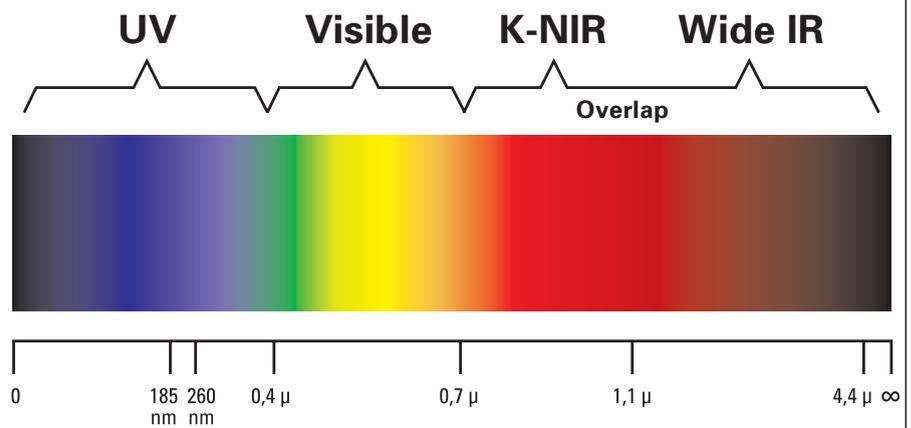
Air-drying 2-component pad printing inks require several days until they have fully cured. This long dwell time is not always very feasible for quality tests of resistance values. Inks with medium drying speeds require about 2 minutes until they are dust-dry. In that stage the ink is not yet scratch resistant, to reach this resistance several hours are required. We carried out a K-NIR test by drying the printed parts for 3 seconds in the K-NIR equipment followed by 10

seconds cooling time. Immediately after this we successfully tested the prints for scratch resistance. Resistance tests carried out after 2 hours all passed and met each and every one of the requirements*. With air dried prints resistance tests could only be carried out 5 days after printing when the 2-component ink had fully cured.

Compared to UV-curing which is a matter of split seconds 2 to 5 seconds NIR drying time may seem long at first sight, however it really doesn't make much difference in practical applications. The time period between further processing of NIR dried parts and UV-cured prints is not significantly longer.

K-NIR Technology

K-NIR radiation is a very high energy range of optical radiation - only partially visible



WHICH PRINTING APPLICATIONS IS K-NIR SUITABLE FOR?

K-NIR is primarily suitable for printing applications using small amounts of solvent based 2-component inks where solvent emission is relatively low. Even though these days you can carry out a broad field of applications with UV inks, they cannot completely substitute 2-component ink systems. As always you have to evaluate the process as a whole. At this point we do not intend to discuss the advantages and disadvantages of UV-technology compared to solvent based ink systems, we only intend to explain the fact that quick and immediate further processing of printed parts can also be achieved with solvent based ink systems. The suitability of K-NIR has to be confirmed for each individual application. Pretests can be done quickly and effectively with mobile drying units.

**) These laboratory trials were carried out to improve the process of one of our customers. Mechanical and chemical resistances of one of our pad printing inks could be achieved quickly using K-NIR radiators. Before then these properties were only achieved after laying out the prints for several days at room temperature.*

Example: mobile system



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