Harald Tröger
Laboratory:
Pad Printing

PROGRAM OF UV-CURING INKS FOR PAD PRINTING

Coates Screen Inks GmbH is constantly expanding and improving the program of UV-curing pad printing inks. Ink ranges such as TP/UV-P, TP/UV-P2 and TP/UV-R have already been widely accepted on the market. Our program now also comprises other UV-curing pad printing inks for special applications. In this article we want to give you some details about these pad printing ink ranges.

WHY USE TP/UV INKS?

When dealing with this topic, one will surely ask the question why should I use TP/UV inks and what advantages do they offer? One big advantage is that TP/UV inks cure quickly. Further processing of prints is possible immediately after printing, an especially important feature for in-line production where a pad printing equipment is installed in a complex production line. Another advantage of this quick drying is that you do not need long curing times before feeding bulk materials to avoid scratching or damages as they are already fully cured when falling into the bulk container.

Quick drying generally is an important feature as printers will be able to react flexible and quickly to urgent customer demands. Printers do not have to wait for long periods of time for UV prints to fully cure like you have to with 2-component solvent based pad printing inks.

But these are not the only advantages. Detailed further developments of existing UV curing pad printing inks have further standardized the pad printing process so that cost efficient prints can be made without jeopardizing the quality - another important advantage of UV pad inks.

4-colour process prints can be reproduced with a much higher resolution as you can work with significantly finer halftones (150 lines/cm) and flatter plates without risking that the fine details dry into the cliché and cannot be reproduced any more.

Apart from the technical and economic aspects there are also environmental matters to be taken into consideration. Compared to conventional ink systems the solvent content of UV-curing pad printing inks is significantly lower and therefore you will have less solvent emission.

Basically, TP/UV inks do not necessarily require solvents. However, to achieve good processing properties, small amouts of solvents are essential. Only with solvents you can avoid increase of stickiness and achieve a good transfer from plate to pad and from pad to plate during the printing process.

MAIN INK RANGES

TP/UV-P

Ink range TP/UV-P was originally developed as UV curing alternative to TP 300 for the same variety of substrates.

TP/UV-P2 also belongs to ink range TP/UV-P. This is a modification and further development of TP/UV-P achieving good adhesion on polyamide.

TP/UV-R

TP/UV-R is an ink range on the same chemical basis as our ink range TP 218. TP/UV-R shows good abrasion resistance and excellent suitability for quick running pad printing equipments.

LAB-N 151584

UV-curing pad printing ink system especially developed for printing of golf balls.

Ink range LAB-N 151584 also comprises special adjustments
- LAB-N 151584/70-02-NT (glossy)
- LAB-N 151584/70-01-MT-NT (mat) .

These are hardcoats protecting printed parts against scratching. They can also be used to avoid abrasion of soft or delicate substrates.

ADDITIONAL INK RANGES

TP/UVG

This UV-curing pad printing ink was especially developed for printing onto glass materials. TP/UVG is processed without any addition of hardeners and can be cured using low energy. In case the requested resistances are not met, 5% hardener TP 219/GL can be added to TP/UVG - in that case you have to consider the relevant pot life.

TP/UV-D

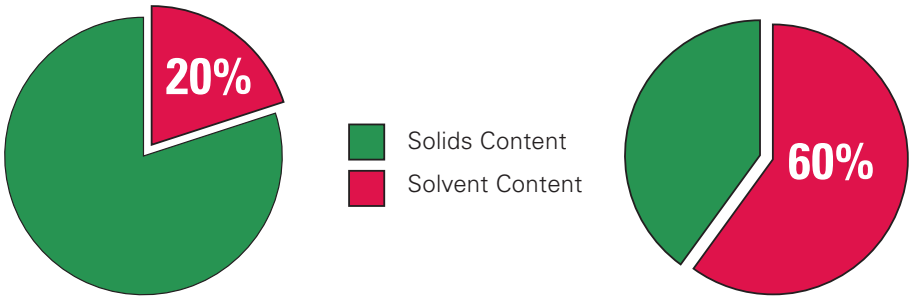
TP/UV-D is another state-of-the-art pad printing ink, which can be processed with and without hardener. With the addition of 10% TP 219/D the ink system will cross link due to radical addition polymerization and also form a polyurethane structure via OH-bonding and isocyanate just like conventional solvent based inks do. Due to this dual cross-linkage the chemical and mechanical resistances achieved are excellent.

TP/UV-K (CATIONIC CURING)

Curing of ink range TP/UV-K is completely different to that of conventional UV-curing pad inks. The advantage here is that no acrylate monomers are left in the ink film after curing. On the other hand, this UV ink has a significantly higher energy requirement of 2000 mJ/cm, often a problem when printing on plastic materials.

The pad printing laboratory of Coates Screen Inks GmbH is currently working on a new modification of TP/UV-K with a lower energy requirement. This modification could possibly be suitable for printing of food packaging materials such as rotation printing of beverage closures.

COMPARISON SOLVENT CONTENT OF UV AND SOLVENT BASED PAD PRINTING INKS



UV-CURING PAD PRINTING INKS | **SOLVENT BASED PAD PRINTING INKS**

MAIN INK RANGES	TP/UV-P	TP/UV-P2	TP/UV-R	LAB-N 151584
Main Application	Suitable for printing of ABS, SAN and PS	Especially suitable for printing of polyamide	Rigid and plasticized PVC, polycarbonate; polyester	Printing of golf balls
Additional Application	Pre-treated PP and PE	ABS, SAN and PS	Coated surfaces	ABS and SAN
Properties	Good reactivity	Good reactivity	Good chemical and mechanical resistances	High mechanical resistance
Curing Energy*	500-1000 mJ/cm^2	500-1000 mJ/cm^2	500-2000 mJ/cm^2	500-1500 mJ/cm^2
Colour Ranges	C-MIX 2000 Process Colours Highly opaque white	C-MIX 2000 Process Colours Highly opaque white	C-MIX 2000 Process Colours Standard Black 65 Standard White 60	C-MIX 2000 Process Colours Protective Varnishes -LAB-N 151584/70-02-NT -LAB-N 151584/70-01 MT-NT
Addition of Hardener	Yes 10% TP 219/N Pot life: 8 h	No	No	Yes 10% TP 219/N Pot life: 8 h
Curing Technology	Radical Curing	Radical Curing	Radical Curing	Radical Curing
Processing	Open and closed pad printing equipment Crosswise doctoring systems	Open and closed pad printing equipment Crosswise doctoring systems	Open and closed pad printing equipment Crosswise doctoring systems	Open and closed pad printing equipment Crosswise doctoring systems

ADDTIONAL INK RANGES	TP/UVG	TP/UV-D	TP/UV-K
Main Application	Especially suitable for printing on glass surfaces	Especially suitable for printing of uncoated golf balls	Metal surfaces
Additional Application		Polyurethane	Polypropylene, Polyethylene
Properties	Good reactivity	Good reactivity	Good chemical and mechanical resistances
Curing Energy	500-1000 mJ/cm^2	500-1000 mJ/cm^2	2000 mJ/cm^2
Colour Ranges	C-MIX 2000 Process Colours Highly opaque white	C-MIX 2000 Process Colours Standard Black 65 Standard White 60	C-MIX 2000 Standard Black 65 Standard White 60
Addition of Hardener possible	Yes 5% TP 219/GL Pot life: 8 h	Yes 10% TP 219/D Pot life: 18 h	No
Curing Technology	Radical Curing	Dual Curing	Cationic Curing
Processing	Open and closed pad printing equipment Crosswise doctoring systems	Open and closed pad printing equipment Crosswise doctoring systems	Open and closed pad printing equipment Crosswise doctoring systems

*measured with
Kühnast UV-Integrator

Harald Tröger
Laboratory: Pad Printing

+49 911 64 22-245 +49 911 64 22-283
harald.troeger@sunchemical.com