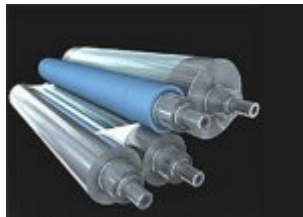


UV INK COMPATIBLE ROLLERS & BLANKETS

The smartest thing that you can do, especially if you are new to UV & EB inks, is to rely on the experienced roller, blanket, wash-up, and ink supplier for recommendations.

The use of proper, compatible materials for rollers and blankets is necessary if one is to expect consistent, trouble-free results when printing with UV & EB energy curing inks.

The rollers in printing equipment are there for the specific function of supplying a consistent thin film of ink to the printing plate.



In doing this, the roller material has to be elastic, and capable of working under compressive pressure while maintaining its dynamic qualities and dimensions.

Consequently, rollers are made from elastomers, which are polymers that are compounded with other materials to produce elasticity. Elastomers may be rubber, or other materials, such as polyvinylchloride or polyurethane.

Traditionally, most rollers used with conventional inks are made from synthetic rubber compounds. These materials perform admirably with conventional inks. However, the introduction of UV inks and their more aggressive raw materials resulted in roller problems. Roller swelling, and a consequent change in impression affecting registration, caused all sorts of printing issues.

UV inks are formulated from raw materials that differ in part from those used in conventional inks as shown here.

| Conventional Ink | UV Ink |
|------------------|---------------------|
| Pigments | Pigments |
| Resins | Acrylic Prepolymers |
| Vegetable Oils | Or Oligomers |
| Mineral Oils | Acrylic Monomers |
| Drying Agents | Photo initiators |
| Additives | Additives |

Taking these differences into consideration over the many years that UV printing inks, varnishes and coatings have now been marketed, the issues of chemistry confronting rollers and blankets have been addressed.

The result is that many excellent performing elastomeric roller formulations are marketed to a maturing UV & EB printing industry.

Two types of rubber materials have evolved to be commonly used by the UV printing industry. These are EPDM (ethylene-propylene-diene-terpolymer) and BUNA, the latter also known as "nitrile". Nitrile rollers have been used successfully with UV inks as long as they are "low swell formulations", but they can't be used with UV varnishes and coatings. Nitrile has its problems, as it offers poor resistance to chlorinated solvents and ketones. Nevertheless nitrile rollers (without polyurethane) have had some success.

EPDM as a material has proven to be usable with UV inks, coatings and varnishes. However, EPDM cannot be used with conventional inks, because it does not tolerate exposure to conventional ink raw materials such as, toluene, hexane, aromatics and hydrocarbon oils. On the other hand it has excellent resistance to the monomers, oligomers and UV photo initiators used in UV & EB inks. EPDM, as a compound is very hard and it has been a challenge to produce rollers with the acceptable Shore hardness/softness of common NBR rollers. However, plasticizers have been successfully introduced into roller compounds making acceptable products available. These still present some problems

in that press heat and wash-ups tend to remove plasticizer from rollers causing them to become hard and shrink. This condition can be aggravated by the use of aggressive wash-up products or improper roller adjustments.

Generally, the latest practice favors EPDM as the compound preferred for dedicated UV & EB printing. It's been found that EPDM rollers must be used only where printing is dedicated to UV & EB, inks with no exposure to conventional inks. A single exposure to conventional inks or their wash-up solutions can produce damage that cannot be reversed.

Newer non-pvc based compounds are preferred for dedicated dual use with UV and conventional inks. These products have good dynamics and chemical resistance matching EPDM resistance to most UV & EB inks.

NBR (nitrile-butadiene-rubber) is the most commonly used rubber compound for conventional ink printing. It has excellent resistance to hydrocarbon oils and other solvents used as the vehicle for coldset, heatset and conventional sheetfed inks. NBR rollers can be made with a broad range of hardness and have good dynamic qualities. NBR compounds have limited resistance to monomers, oligomers and the UV photo initiators used in UV & EB inks. NBR is also attacked by esters, ketones and other aggressive solvents used in UV & EB wash-up formulations. While NBR can be used as a dual use roller material, as long as the dual use is limited, roller life is said to be severely limited.

Because of these limitations it is essential that exposure to any products that can cause roller swelling be limited. Special attention should be paid to roller and blanket wash-up solutions.

Rollers and blankets that are used for UV printing and coating must only be washed with UV compatible solvents. Conventional ink wash-up solvent solutions, containing petroleum solvents, may cause curing problems if they become absorbed by rollers or blankets. When both conventional and UV inks are in use, the last or flushing step of press wash-up should be compatible with the conventional ink system.

Blankets have presented similar problems to those encountered with rollers, since the same general raw materials are used in their fabrication.



Today's printer is fortunate in that many years of UV printing experience has produced many blanket products that can be recommended.

Currently, desirable compressible blankets of EPDM and nitrile rubber composition are readily available. It can be noted that blanket performance can be improved if the blanket is treated on a regular basis with a renewer that lubricates, which will maintain a surface conducive to good ink acceptance. Further, install blankets properly for the best achievable printability, and be sure that the blankets chosen do not swell more than 10% when submerged for 24 hrs in UV or EB inks or press wash.

In conclusion, for the best in acceptable UV & EB compatible rollers, blankets and wash-up solution, seek supplier recommendations. Additionally, follow the press manufacturer's advice on roller and blanket installation and adjustment, and you will have the best chance of producing exceptional energy curing printing and coating results.

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