Cork Tech TalkNews

Manufacturers of Waterbase, UV+EB Curable Coatings, Varnishes and Adhesives

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DOCTOR BLADES - A SPECIALTY TODAY

Doctor blades are a key component of the flexographic and rotogravure printing/coating processes. They are also vital to specialized aqueous and UV coating equipment dedicated to sheet fed & web offset over-coating.

The purpose of a doctor blade is to shear fluid ink or coating from the surface of an engraved roll. This ensures more controlled inking or coating of a printing/ coating application plate. Ideally, a doctor blade cleanly shears ink or coating from the engraved roll surface, leaving ink or coating only in the roll cells. The ink or coating volume is then controlled by the engraved cell size and its geometry.

Historically, the doctor blade was considered a necessary but common commodity item. However, in recent times doctor blade using technologies have come to realize that the lowly doctor blade is playing a more important role. Advances by the printing ink and coatings industries have brought into play a plethora of new and different products, opening the door for better performing doctor blades.

These considerations have developed a trend wherein doctor blades are being selected for very specific applications. Today, doctor blades are being carefully chosen based on their ability to effectively doctor specific products, their handling and roll wear characteristics, blade life and total use cost.

Printers today are not stuck using the so called universal blade, but find they are capable of using better suited steel, plastic and coated blades in the same press.

Metal blades, mostly steel, continue to be the blade of choice for high-end, high screen count, quality printing, but often, metal blades are more difficult to handle in use and may well have a shorter life cycle.

Nonmetallic blades have become popular for lower end graphic production and coating applications. They are notably easier to handle in use, and offer a longer life cycle than metal blades.

Nonmetallic and metal blades are both offered with a variety of application driven tip configurations.

Some inks and coatings will not print or coat well with certain blades, and care must be taken in choosing the best blade for the application.

UV flexo inks, in particular, have been challenging to the printer, due to their heavier consistency, resulting in high hydraulic forces being applied to the doctor blade. This excessive force has lead to unwanted ink spitting, causing print defects.

Ink spitting, however, is an ink problem. UV ink transfers differently on press than water and solvent based inks. Fundamentally, the problem is viscosity because UV inks run 5 to 7 times higher than the common 25-27 seconds 2 Zahn water/solvent ink viscosities. Further, because of UV products thixotropic property of becoming thinner when disturbed, the ink does not always release without spraying or spitting.

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One means of minimizing this problem is to use a thicker blade. It is recommended, that a thicker blade be used, as is the recommendation with coating and adhesive applications.

Photo courtesy M. Daetwyler

Gravure printers historically have put up with hazing, streaking, and drag outs while flexo printers are challenged by anilox scoring, blade chatter and short blade life cycles. These problems have presented opportunities to blade manufacturers to design new blade products. Many blade shape configurations in a variety of materials have been, and continue to be, developed to be problem and application specific.

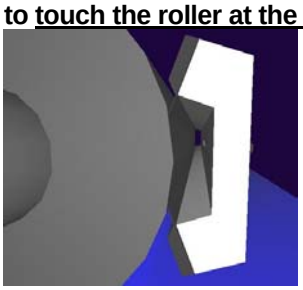
Longer life blades have been developed using harder materials, treatments and surface coatings. These are offered especially to accommodate the faster press speeds and longer press runs that typify some of today's higher speed production presses.

It is important not to forget that proper blade setting to the anilox or other roll is critical to both blade and cylinder life.

New composite blades are available with abrasive particle tips designed to clean a ceramic roll surface. It's said that these blades can last up to ten times longer than steel blades and provide more consistency over the blades life cycle.

Roll scoring is one of the major problems facing the flexo printer. The doctor blade, because it is mounted stationary to the moving anilox roll, catches most of the heat (blame). Roll scoring of course is evidenced by thin, circumferential lines appearing on the anilox during a press run. They can appear as light streaks or deep, dark marks showing across the length of the roll. Doctor blade holder or chamber alignment, chamber loading pressure, and the condition of the anilox roll can all affect scoring.

It must be remembered that alignment of the blade holder and/or the chamber is essential to high quality printing/coating. Attention to setup is critical in order for the blade or blades to touch the roller at the same time.



Chamber loading pressure that is too high will cause the doctor blade to bend or curl, deflecting the blade, adding to scoring problems. Pressure should be "as little as possible and as much as needed".

Too much pressure applied to a doctor blade can also cause a burr to form, which if it breaks free, can produce scoring.

When a ceramic anilox is engraved by a laser some slag is deposited on the surface resulting in a roughened finish. This can cause a blade to bounce and vibrate. The bounce can cause higher volumes of ink/coating to be delivered initially.

Super-finishing is a means by which these problems can be eliminated. A diamond grinding/polishing process produces a super smooth, consistent ink doctoring roll surface.