# Doctor Blades for EG Printing

## BLADE SELECTION & APPLICATION

*"...for EG printing to be effective, tighter control of color, dot gain and ink transfer to plate needs to be maintained."*

Bill Warner

In today's business environment, increased efficiency and reduced press downtime are not just buzzwords—They are necessities for a successful operation.

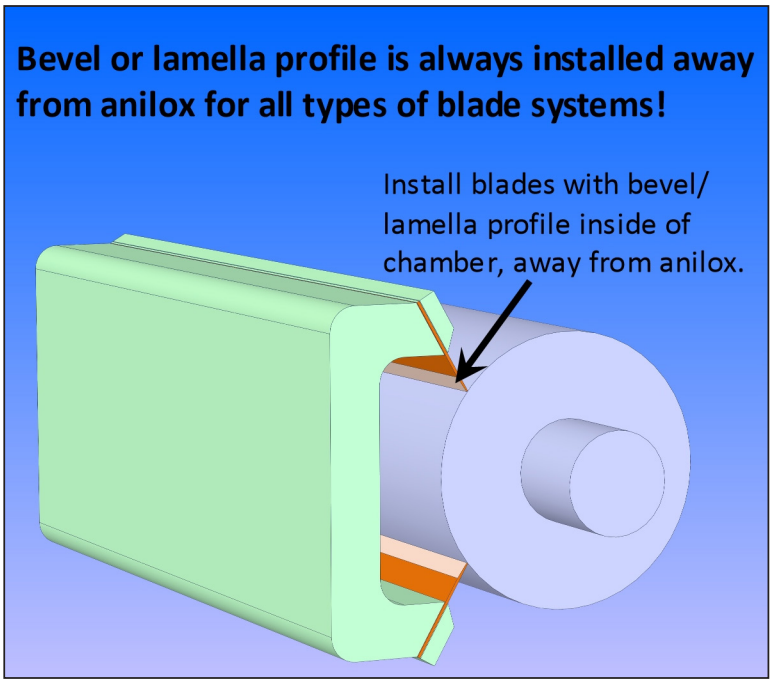
Expanded gamut (EG) printing is a way to increase efficiency by eliminating the need for spot colors and washups between jobs. Efficiency can also be gained by running multiple jobs at the same time when using EG printing.

However, for EG printing to be effective, tighter control of color, dot gain and ink transfer to plate needs to be maintained. The doctor blade directly affects dot gain and ink transfer, since its main function is to provide uniform metering, so that only the anilox volume determines the amount of ink transferred to the plate. To achieve uniform metering, the correct doctor blade needs to be used for the application and it needs to be installed and set properly.

This article will provide guidelines on how to select and apply doctor blades to help achieve uniform metering throughout the run, so the benefits of EG can be realized.

### EDGE SHAPE

There are many options in doctor blade materials and edge shapes, so what would be good choices for EG printing? Since multiple jobs can be run without the need for washup between them, it is desirable




ALL IMAGES COURTESY OF ALLISON SYSTEMS CORP

to not change the doctor blade between runs either. To accomplish this, use a long-life blade. Non-metallic blade materials provide long life and some materials approach the metering properties of steel.

However, I would recommend steel doctor blades, as they will provide better, more consistent metering throughout the life of the blade. Although blades made from carbon steel are a popular option for short-run, non-abrasive applications, blades made from premium tool steel, or other steel grades with applied long-life coatings, are a better choice for EG applications.

EG printing requires precise metering to deliver consistent and repeatable results, so you will need a sharp doctor blade edge. The shape of the working edge will directly affect metering quality, whether it is a rounded tip, lamella or beveled edge. Rounded edge shapes can be used with lower linescreen (< 500 lpi) anilox rollers. Higher linescreen anilox rollers, typically used with EG printing, will require a lamella or beveled blade that has a small, polished working tip.

A lamella edge will provide the most consistent metering results over a long run or several shorter runs ganged together. However, the lamella edge can also be susceptible to over-deflection issues, leading to poor metering, when used with too much applied pressure. A beveled blade is less susceptible to over-deflection problems and will provide the metering quality needed for EG printing.

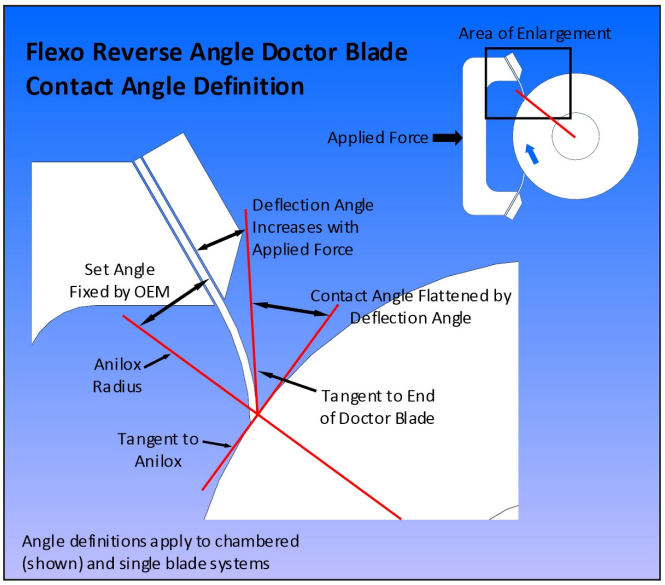
## BLADE THICKNESS

Blade thickness must also be considered to achieve precise metering over long periods of time. Minimum recommended blade thickness for a steel blade would be 0.008-in. for most water- or solvent-based inks. You may benefit by using a thicker blade if you are running higher-viscosity inks and/or high press speeds.

UV inks will generally meter better with a thicker blade that is either 0.010-in. or 0.012-in. thick. With all the combinations of materials and edge shapes available, work with your blade supplier to find the right material and edge shape combination for the types of jobs running in your plant.

## ALIGNMENT & ANGLE

The best blade available will not perform well if it is not applied properly. A common source of confusion when using a beveled or lamella edge blade is which way to install the bevel/lamella. To help clear up any confusion, remember the doctor blade is intended to be installed with the bevel/lamella facing away from—not against—the anilox in all applications.




The doctor blade also needs to be aligned parallel to the anilox roller in all directions to meter as it is intended. Any misalignment between the doctor blade and the anilox roll will reduce the quality of the wipe that is delivered by the blade. Blade-to-anilox alignment does not need to be checked every time a blade is installed, but it should be part of the regularly scheduled maintenance work for the blade system.



The most critical part of the doctor blade setup is blade angle. Doctor blade set angle is fixed on most flexographic blade systems for both chambered and single-blade systems. Therefore, there is not much you can do to control the angle, other than running the system at the minimum applied pressure required to maintain a clean, uniform wipe. A generally acceptable flexographic doctor blade contact angle range is 25 degrees to 40 degrees, depending on the system.

Doctor blade contact angles between 30 degrees and 35 degrees are nominal good angles for preventing print defects. Flat angles (less than 25 degrees) are typically the result of too much pressure and will not provide proper metering of anilox rollers. Too much force applied will quickly wear in a big flat on the blade surface, cause dot gain, inconsistent print and possibly load dry ink, blade material, or other hard particles into the anilox roller and damage it.

## APPLICATION PRESSURE

So how do you know what the application pressure should be? The blade application pressure should be low enough to obtain a clean wipe and maintain minimum blade deflection through the printrun. If the doctor blade is set up with a large deflection at idle, it may over-deflect at high production speeds. Using a thicker doctor blade is not always the answer to solving this phenomenon; correct application pressure is the way to control blade deflection.

If your blade system is air loaded, set the application pressure by adjusting the air pressure after initial movement of the blade system. It may require a larger pressure to move your blade system into position, but after the system has moved, lower the pressure to the minimum needed to obtain a clean wipe. The message is the same for mechanically actuated systems—When a new blade is installed, adjust the system so the minimum amount of pressure is being applied to the blade. Any additional pressure will have a negative effect on metering uniformity. If you must add more application pressure than normal to achieve proper metering, you may have installed the doctor blade incorrectly, or have damaged or misaligned blade system components.

*"To achieve uniform metering, the correct doctor blade needs to be used for the application and it needs to be installed and set properly."*

## END SEALS

No discussion about how to achieve the best performance of your doctor blades would be complete without at least mentioning chamber end seals. End seals that are not properly matched to the application can be a source of doctor blade problems. A poor-fitting end seal, or the wrong material, will require extra applied pressure to stop leaks during the initial setup or during the run.

Extra pressure could over-deflect the doctor blade, leading to blade-related issues. Additionally, the doctor blade is often replaced with the end seal, even though the doctor blade may have many hours of life remaining. The goal is to have both the doctor blade and the end seal reach end of life at roughly the same time. To extend end seal and blade life, the press operator must use the least amount of pressure possible.

In summary, to be successful with EG printing, the doctor blade must be treated as a critical part of the flexographic printing process, so that it can deliver the blade life and consistent metering EG requires.

Take the time that is necessary to choose the correct long-life doctor blade material with an edge configuration suitable for your job parameters, and then set it up correctly with a minimum amount of applied pressure.

If you need help, work with your blade supplier to determine the optimal blade for your application and to analyze your setup parameters. Optimized doctor blades will help ensure your success with EG printing and reduce costs, increase efficiency and reduce press downtime. ■

**ABOUT THE AUTHOR:** *Bill Warner is vice president of Allison Systems Corp. Throughout his 35+ year career with Allison, he has been involved in the application of doctor blades and doctor blade-related components for various printing processes. Specific areas of experience include doctor blade sales, tech support, training and R&D, as well as the design of custom retrofit doctor blade holders and systems. Bill has a mechanical engineering degree from Drexel University. For more information, visit www.allisonblades.com or contact Bill directly at bwarner@allisonblades.com.*