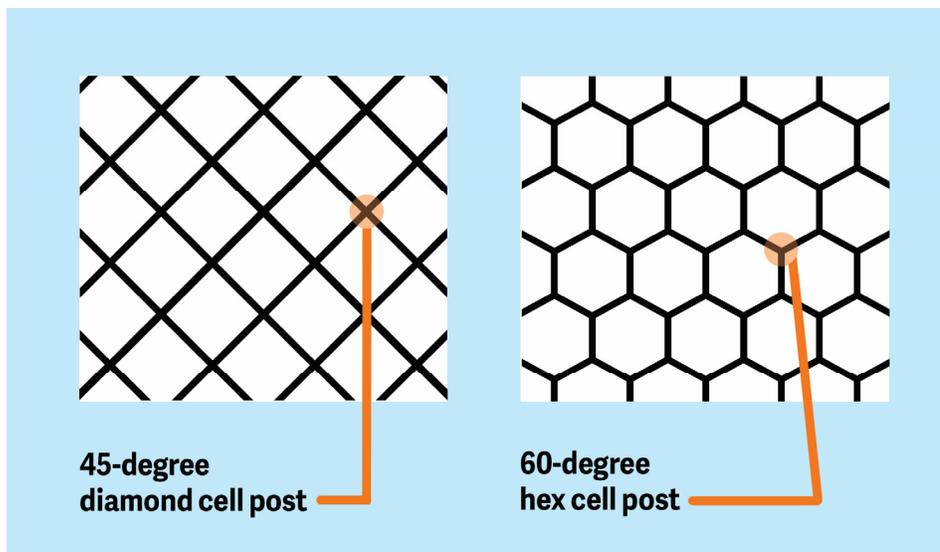


Shape, Volume, Count: Standard Anilox Specifications in Flexo Packaging and Why They are Embraced

If your heart is not functioning properly, neither is your body or brain. This, of course, can lead to major health issues. The same holds true for an anilox roller or sleeve—often referred to as the “heart” of the flexographic press. If it’s not specified correctly or maintained properly, the flexographic press will not perform efficiently. Print quality will suffer.

Closed cell technology gives the press operator the optimum control transferring ink film to the plate. In today’s flexographic industries, regardless of the products being converted, the 60-degree hexagonal cell is still the most commonly used **shape**, whether printing brown kraft corrugated boxes or the finest process printing on film or coated paper. That **cell’s volume** is measured in billions of cubic microns (BCM) per square inch. The volume of ink which a roller can hold affects the density, crispness, and overall tonal range possible for the printed image. **Cell count** refers to the number of cell lines per inch (LPI) along the engraving axis. It’s the cell volume and cell count that routinely vary, based upon your overall printing requirements.



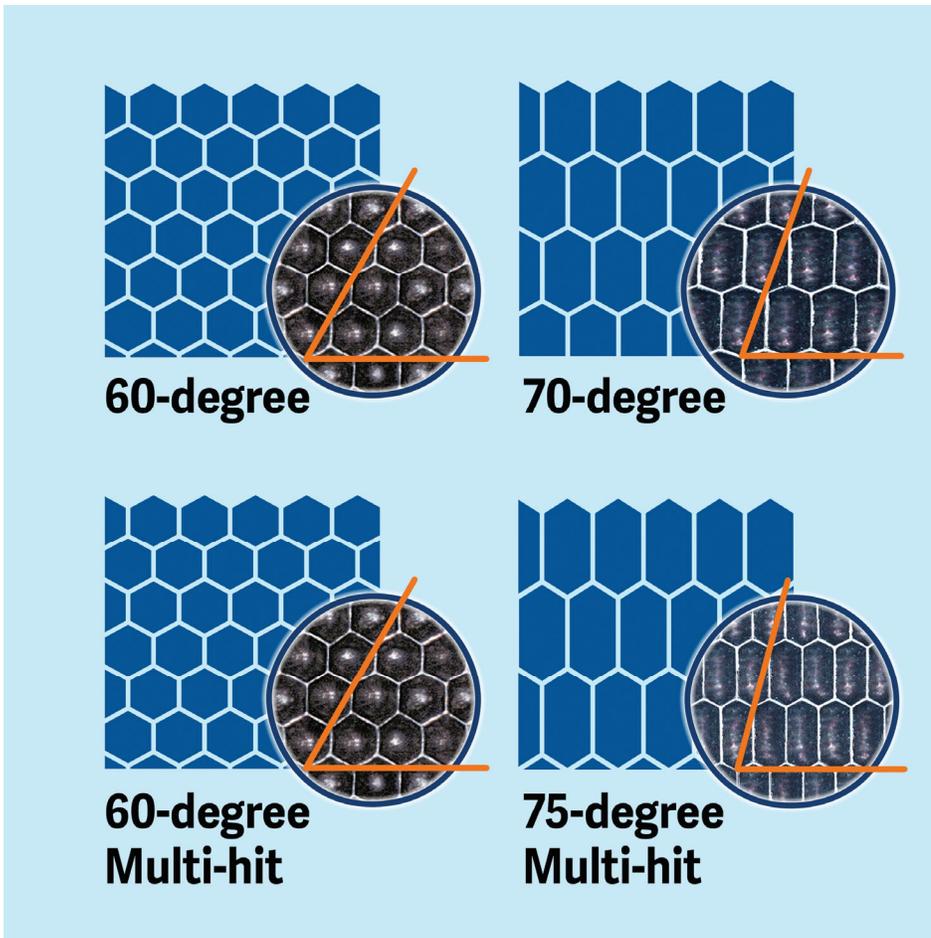
The 60-degree laser engraved ceramic anilox roller came into being in the early nineties, replacing 45-degree diamond engravings which were similar to mechanically engraved rollers from the past. The 60-degree cell has thinner walls, thus a larger opening for better ink release, and only three cell walls intersect at the “post” of the cell, as compared to four walls on 45-degree cells. This is important because the post area does not transfer ink, and the lesser wear in the post area of the 60-degree cell minimizes loss in ink transfer.

On average, 60-degree anilox cell counts and volumes in the sheet-fed corrugated industry range from approximately 200 LPI with a 9.5 BCM volume to 400 LPI with a 4.5 BCM volume, dependent upon graphic requirements and the type of board being printed (i. e. brown kraft, mottled white, bleached white or high-holdout coated board). On some print jobs with coated board, you’ll even see engravings as fine as 800 to 1000 LPI for process jobs with minimal absorption on the paper. But this is very rare.

What’s also become very popular in the corrugated industry, especially for line and heavy solid work, is the 70- or 75-degree extended or elongated cell which offers better ink release due to the cell’s shape. This elongated engraving allows for more volume in a particular LPI because multiple cell walls are eliminated cylindrically around the roller in the engraving process, leaving more room to carry ink. Thus, an operator that had been using a 250 LPI, 7.5 BCM, 60-degree roller (probably the standard for most presses in the average box plant) can consider going to a 330 LPI, 7.5 BCM, 70-degree roller to achieve the same volume needed, but the finer 330 LPI will provide cleaner, sharper edges, reverses, and type. It’s always been said in the flexographic

industry, “use the finest anilox line screen that you can, as long as you get all the color that you need!” While these elongated or extended engravings provide more volume and better release, they are also easier to clean, which is an added advantage.

In the narrow web, wide web, and preprint industries, on average, 60-degree anilox cell counts and volumes generally range from a 360 LPI with a 5.0 BCM volume to 1400 LPI with a 1.0 BCM volume. Again, this is dependent upon the print requirements and the substrate being printed. There are very simplistic tag and label jobs, as well as wide web paper or film jobs, that utilize similar engravings mentioned in corrugated printing. But in 4-color process or expanded gamut printing, finer screens, and lower volumes are usually required, based upon the line screen of the printing plates being used and in order to avoid dot gain or dot growth when the plate dots dip into the cell due to limited wall support and transfer the ink ineffectively causing “dirty” print quality.



On many sophisticated process jobs there are often certain background colors and solids that require more ink density, but where a finer LPI anilox roller or sleeve is still required. This is achieved by the anilox manufacturer utilizing a “multi-hit” process during engraving. Different from the standard single-hit technology (each cell is burned once with the laser beam), as is common on corrugated anilox rollers, the multi-hit process has multiple beams that burn each cell multiple times. This results in higher volumes being obtained on the same LPI roller, as well as cell walls that are even cleaner, sharper, and more uniform than standard engravings. This is an advantage and a necessity for the finest printing requirements.

While specifying the correct anilox roller/sleeve angle, line screen and volume are critical in order to achieve success, **maintaining the volume** is one of the most difficult issues in each industry. Poor roller maintenance can result in heavily plugged cells that often transfer less than 50% of what they were designed to deliver, even when there is no visible wear to the cell walls. But obviously cell wall wear, due to excessive blade pressure, abrasive inks, etc. , also contributes heavily to inefficient ink transfer. Converting management needs to work

with their anilox roller/sleeve suppliers to monitor anilox conditions with audit analysis. When dirty, plugged rollers need to be addressed, some companies have their own cleaning procedures: cleaning chemicals, soda or dry ice blast units, plastic bead cleaning equipment, or the latest sophisticated laser cleaning devices. Most companies, however, contract with outside vendors to come on-site on a scheduled basis to perform the cleaning with the equipment mentioned above. If using cleaning chemicals, the operators should always confirm that the cleaning agent is properly diluted and not a concentrated formula. Otherwise, this could result in surface blistering and the need for reconditioning. When utilizing soda or dry ice cleaners, the proper OEM specified pressures should be followed in order to avoid cell degradation.

In closing, please note that there are many other cell configurations offered to the flexographic industry such as hourglass, channeled, and tri-helical cells (often used in coating applications), open S-shaped engravings to promote ink release and traditional 45-degree diamond shaped, etc. Certainly, line screens of less than the aforementioned 200 LPI and much greater than the aforementioned 1400 LPI are supplied for various print jobs. The shape, volumes, and cell counts mentioned above are merely standards in the industry. To achieve the most efficient transfer of ink to the printing plate and highest quality results, it's best for the converter to work closely with his/her anilox roller manufacturer, plate supplier, and ink supplier- a true team approach!

About the Author



Steve Woodard, vice president of corporate services for [ARC International](#), is a 38-year veteran of the anilox roller and related industries. A 1976 graduate of UNC Chapel Hill with a B.S. in business administration, he is in his 35th year of service with ARC International and is responsible for the development and management of national account programs with corrugated, wide web and narrow web corporations. Throughout his career, Steve has been active with TAPPI, AICC and FTA with committee involvement and technical presentations. In 2012, he received his certification as a Six Sigma Green Belt from UNC Charlotte.