

ANILOX - THE BASICS

While **ANILOX**, the ink-metering roll in flexo printing is well known in flexography, it is not in sheetfed offset printing where new double coater presses now offer an anilox print/coat station. The purpose of this station is to allow fine line precise coating application across a sheet's full width, including gold/metallic applications, replacing powder bronzing.

Additionally, these new double coater press designs allow the application of two bumps of coating in-line, such as a first down aqueous primer, followed by a UV coating application or a second aqueous coating application.

The name anilox comes from the 1939 introduction of a chromed, mechanically engraved ink-transfer roll to the rubber plate flexo industry, which at that time used aniline inks (inks made from water soluble coal tar dyestuffs). Prior to this development, nip pressure between two rubber rolls controlled the distribution of ink.

In the most simple form, flexo printing has four component parts: a fountain roll (rubber) in an ink/coating pan, an anilox (ink metering roll), a plate cylinder, and an impression cylinder. Improvements have led to replacement and elimination of the fountain roll by an anilox with a doctor blade riding in the ink/coating fountain

The latest technology advancement features the manifold or chamber type doctor blade system. Here, two doctor blades one mounted at a positive angle to rotation, and the other at a negative angle to rotation are connected to an enclosed box fitted with flexible end seals. This structure is fitted against the anilox roll to which ink or coating is pumped through the enclosed chamber.

The advantage to this system is very precise ink or coating application across the entire press width. Further, since the applied material is never exposed to the air, very tight viscosity control also results.

An anilox or ink metering roll has one purpose which is to supply a uniform and measurable volume of ink or coating to the surface of a rubber or photopolymer printing plate. This is accomplished using a wiping blade system (doctor blade) which wipes the surface of the engraved roll so that an accurate volume of ink or coating reaches the plate.

Anilox rolls today are supplied from a number of manufacturing techniques. Among these are laser engraved ceramic,

mechanically engraved chrome plated stainless steel, mechanically engraved ceramic coated, and electronically engraved copper. The tiny engraved cells cover the roll varying from 80 to over 500 per linear inch.

Cell volume is expressed in billion cubic microns per square inch of roll surface. The engraved cell structure takes the form of inverted truncated pyramids. In use it is the base of the pyramid or the solid surface of the roll between cells that wears. As this surface wears the inverted pyramid becomes more shallow thereby holding less volume of ink or coating. Because we are dealing with the base of the pyramid the largest volume of the cell is affected first. Most important is the fact that just a little wear causes great changes in the volume of an ink or a coating carried and transferred. Dramatically, a 20% cell depth reduction caused by wear can result in a volume reduction approaching 50% depending on screen count. Another concern is the fact that particles of ink/coating will always be found in the bottom of a cell even after a thorough scrub cleaning. This somewhat reduces the wet volume of ink or coating contained and transferred.

Several forms of cell structures are possible. The pyramid cell is simply an inverted pyramid coming to a point. The trihelical is an unbroken line engraved at a 45 degree angle to the roll axis. The quadrangular, or quad, is an inverted pyramid with the bottom cut off. The hexagonal cell has six sides and offers better material release. The quad channel screen cell is a deep cell with a shallow, vertical channel connecting each cell.

How is an anilox chosen for correctness?

Volume is always the variable chosen first. Determine the wet film thickness or the anilox volume needed. Important factors are: the type of ink/coating to be used (solvent, water, or UV), the percentage of solids, the doctoring system, the substrate, and the particle size of the applied material solids.

Next the screen and pattern is selected. Usually, the line count or screen should be the finest possible that will produce the applied material volume desired. An exception is when applied material particle size could compromise release from the cells. The most ideal cell depth to cell opening ratio is said to be between 23% and 33% with 28% the optimum.

When screen or process work is a consideration the rule is to choose an anilox screen count that is at least 3.5 to 4 times the value of the plate screen.

Once decided, the pattern or angle of the engraving to the axis of the roll is selected. When solids are being printed, an angle of 30 or 60 degrees is chosen. Recently a 60 degree angle has been in favor because less doctor blade wear results. Either 30 or 60 degrees will produce a striation free, uniform print of solids and line work. Process and screen work are best produced with 45 degree angle engravings, although recently a 60 degree angle has been used with proper separations.

Polishing of hard ceramic coated anilox rolls is recommended to prevent initial start-up doctor blade wear.

In sheetfed press applications, press manufacturers are offering a standard anilox roller that will apply coating at about a one wet pound per thousand square foot rate. The anilox itself will actually carry coating at about twice this rate. However, it must be remembered that the wet coating film is split as it is transferred from the application cylinder to the substrate, effectively transferring only about half of the coating. Other optional anilox rollers are available for specific applications that require greater or lessor than the standard thickness coating application.

Anilox sheetfed litho press tower coater inking and coating capabilities are opening new opportunities. Printers are buying new presses, printing golds and other metallics as well as double coating in-line, applying high gloss UV or aqueous top coats over aqueous primers, over conventional litho inks.

And now not only are OEM litho press manufacturers supplying chambered anilox doctor blade systems, but retrofit equipment is also available.

Soon many more printers will have the capability to more accurately meter, print and coat across the entire sheet width at high press speeds with more consistent and sometimes dramatic results.

As you look to coat using these new press capabilities,!

Again..... **LOOK TO CORK!** for your coating needs, for both aqueous and UV coatings.