

The information and data contained in this document were prepared by a technical committee of the Association. The committee and the Association assume no liability or responsibility in connection with the use of such information or data, including but not limited to any liability under patent, copyright, or trade secret laws. The user is responsible for determining that this document is the most recent edition published.

Overview of the selection process for a laser engraved ceramic anilox roll

Scope

This document provides an overview of some of the items to be considered when selecting a ceramic laser engraved anilox roll for the print stations on presses using flexographic inks on corrugated substrates.

Safety precautions

There are no safety precautions.

Introduction

This Technical Information Paper (TIP) is published to provide an overview of basic consideration and selection criteria for purchasing a laser engraved anilox roll, which is an important part of the flexographic printing process. This TIP begins with a brief review of the ceramic anilox roll manufacturing process. To a large extent, chrome plated mechanically engraved anilox rolls have been replaced over the years by laser engraved rolls because they offer increased durability and a wider range of engraving patterns. Therefore the process of making mechanically engraved anilox rolls is not discussed.

Manufacture of ceramic laser engraved anilox rolls

First, the size specifications are determined and a suitable blueprint is made. After this, the manufacturing process begins with the selection of a mild steel tube of the proper diameter and length. This tube is machined to make it concentric (round) and balanced so it will run in the printing press without flexing/deflecting. After the tube is balanced, the journals are added and machined (Some machines utilize anilox roll designs with one or both journals designed to be demountable). Next the surface is ground to eliminate any machine marks and to bring the roll to within OEM tolerances for run out (TIR or Total Indicated Runout) specifications. TIR is a measure of the roundness or concentricity of the anilox roll and should be closely held at least to within OEM specifications (See references at the end of the TIP). Once the roll is ground it is ready for the final surfacing.

In the manufacturing of ceramic laser engraved rolls, the roll is processed by a grinding process as noted above. Then the roll is coated with a ceramic layer approximately 0.010-0.015 in. (0.25-0.38 mm) in thickness. The roll is then placed in a laser engraving machine where the cell pattern is “burned” into the ceramic. The pattern engraved depends upon the amount of ink required to deliver/transfer the desired amount of ink to the printing plate

Anilox roll selection components

The job of the anilox roll is to transfer the desired amount of ink to the printing plate. How much ink gets transferred is the function primarily of theoretical cell volume. The term “theoretical cell volume” refers to the

TIP Category: Automatically Periodically Reviewed (Ten-year review)



Documents
Document Sharing Hub

volume of ink carried in one square inch of the anilox roll surface. The volume is typically reported in BCM or Billion Cubic Microns. This is determined by the number of cells (called screen count or line count), the depth of the cells, and the types of cells selected. There are many items to consider when determining the proper theoretical cell volume. The proper anilox roll volume for a specific machine is dependent on the type of metering system being used, ink quality and strength, graphics and type of paper being printed, among other items. **For this reason you should consult with your ink, printing plate, and anilox roll suppliers to help select the proper anilox roll volume for each machine.** As the anilox roll wears or becomes clogged with ink it will carry less ink than when originally installed in the press. The anilox roll is a precision instrument and should be treated as such in order to maximize the printing quality it delivers. Proper cleaning and maintaining of anilox rolls will help improve print quality and extend its useful life.

Printing quality requirements

The next step is to determine the primary mix of business that will be run on the press. For maximum productivity, the target should be on the largest segment of the business that will be run on the machine. Most flexo printing units will run components from each mix so choose the segment that represents the majority of the business for that press. Compromises will have to be made for the other segments of the overall mix, such as if the anilox roll selection was made for a graphics mix and a heavy solid is to be printed. A range of suggested cell line counts, also known as line screens, and cell volumes are listed under each segment

Heavy Solids Mix

Brown boxes
Primarily large block type
Mostly one color work
Heavy solid panel coverage
Case code bar coding

180-220 LPI
7.5-9.5 BCM

Average Mix

50% Bleached white
Medium type lettering
Some color print-1 or 2 colors
Some reverses and traps
UPC bar coding

200-280 LPI
6.5-8.5 BCM

Enhanced Graphics Mix

Little or no kraft stock
Screen or half tone printing
Some process printing
Tight registration requirement
UPC bar coding

250-300 LPI (Up to 65 LPI plates)
5.5-7.5 BCM

(Note LPI is lines per inch, BCM is billion cubic microns)

Doctoring or metering devices

The type of doctoring or metering device on the printing press is another ingredient required in order to make a proper selection of the anilox roll to be used. Rubber wiper rolls are speed sensitive and require additional pressure adjustments as press speeds are increased since a thicker film of ink remains on the anilox roll as the press speed increases with this type of metering system. The durometer of the rubber wiper roll must be suitable for the anilox roll engraving in order to provide the best possible wiping of surface ink from the anilox cells. Doctor blade systems, either a single reverse angle or a dual blade chambered system, are not speed sensitive but excessive pressure settings will create friction and accelerate anilox roll and doctor blade wear. The composition of the doctor blades, steel, composite, or engineered plastic will affect anilox wear and ink film thickness. Ceramic anilox rolls should be used with doctor blade metering systems.

Armed with the above facts, the box printer can now make the best selection of anilox rolls for their particular press. The anilox roll surface is optional and secondary to the anilox roll theoretical cell volume. Because of the way a laser engraved ceramic anilox roll is engraved the choices for cell count and volumes are almost limitless-though consideration for cell shape is critical and thus, you should consult with a qualified anilox roll supplier to assist in decisions about anilox roll engraving specifications.

It should be mentioned that crew and management training and experience can directly impact the quality of your print and the life of your anilox roll. Time and funds must be allocated for proper care, cleaning, and maintenance of the print station and the anilox roll. Below is a listing of other related TIPS and references available from TAPPI which you may find helpful.