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Total anilox management

PHIL HALL

For a long time the anilox roll has been regarded as the heart of the flexo press and for a very good reason. Any change in anilox volume influences all the main characteristics of a halftone process print; namely solid colour density, secondary colour, greybalance and dot gain. The more exacting a printer becomes the greater the potential impact of any change.

There is an old adage that unless you measure something you cannot determine if it is changing or the extent of change and as such you cannot predict performance. With an anilox roller the critical factor (key performance indicator) is roller volume because a relatively small change in volume can have a significant influence on the print. Inevitable issues such as surface wear and cell plugging with pigment or resin reduce roller volume.

With industry constantly looking to improve performance an increasing number of printers are now working with low volume very fine screen anilox rollers in order to produce high definition flexo. These rollers tend to be even more prone to wear and plugging. As a result it is becoming increasingly important that printers regularly measure and quantify the volume of their anilox inventory so that the effects of wear and plugging can be identified, monitored and managed.

If the volume of anilox rollers used for fingerprinting is known and this volume is checked on a regular basis to ensure that it remains

within specification, then it is possible to save a significant amount of press time by not having to make as many colour adjustments when setting up process print jobs.

Choosing a suitable measurement system

There is no industry standard for anilox measurement. As a result manufacturers are using different devices to quantify their rollers, as are printers. As the measurement accuracy and error factor of the various measurement devices varies there is a wide degree of variation between different manufacturer's measurements.

The ideal measurement system should have a high degree of repeatability along with a low error factor and should preferably not be operator dependent. In addition it goes without saying that if a system is to be implemented at printers it should be relatively easy to use and be available at an acceptable price.

Instruments for assessing anilox rollers can be broadly divided into volumetric devices and optical devices. Volumetric devices are relatively cheap, are very much operator dependent and tend to have a large error factor, which can be as much as +/- 15% on low volume high line count rollers. The main challenge with these systems is applying a consistent volume of measuring fluid and then spreading it uniformly so that it completely fills all the cells in the area of the stain.

Optical devices in the form of microscopes with a depth field, like the gravure scope, are more costly but can be very useful when it comes to general roller examination as they are able to identify sur-

face damage, changes to the thickness of the cell wall and wear by means of depth measurements. However, it is not possible to quantify volume with these devices, the most important factor, unless the roller has a regular cell structure from which volume can be readily calculated as is the case with old fashioned mechanical engravings.

Where fine screen rulings and irregular shape cells are concerned, the most consistent measuring device is the optical scanning microscope. These instruments have been around for a number of years in different forms, but in the early days the high capital cost of the equipment placed it beyond the means of most printers. In recent years this situation has changed; there is now the *AniCAM* 3D scanning microscope which is both affordable and able to make precise measurements. It works by capturing an image at various depths as an internal stepper motor moves the camera down in fractions of a micron increments. Dedicated software then combines these images to create a 3D representation of the roller surface from which volume can be calculated. A recently developed battery pack makes the device truly portable for use inside the press.

With a system like the *AniCAM* it is possible to set up and implement a sophisticated system of anilox control that takes into account wear, plugging and refurbishment. Ideally this should work on a cradle to grave principle with the volume of a new roller being quantified upon delivery and then monitored at regular intervals throughout its life span. With experience it is possible for a printer to accurately define the point where predefined performance is going to be compromised.

When checking volume, measurements should ideally be made across the face width and at around the circumference of the roller at several positions.

Best practice

Recommended best practice includes setting and agreeing anilox

Managing Director, *Troika Systems Ltd*, Highworth/GB.

Anilox history on AMS.



specifications with the supplier, using an inspection regime to gather historical data for roller refurbishment and evaluating and optimising the cleaning process.

This data needs to be recorded and evaluated and the best way to do this is by employing software specifically developed for the task. On request, *Troika Systems* will provide any printer with a free copy of their *Anilox Management System (AMS)*, which is capable of controlling a printer's complete anilox inventory. The free copy supports up to 24 rolls and can be upgraded without loss of data.

With a good volume measurement system it is possible to evaluate how effective the roller cleaning process is and optimise cleaning time required to achieve the best result. The comparative effectiveness of different cleaning systems can also be evaluated. With the size of the engraved cells on the latest high line count anilox rollers being so small, somewhere in the order of 20 microns, these rollers are more difficult to clean. At this level of magnitude it is likely that some cleaning systems will not be able to clean rollers very effectively so being able to evaluate the efficacy of different systems is very useful.

When the volume of an anilox roller is measured and found to have reduced, it is possible that the roller needs cleaning, but it is also possible that the roller has worn. In this event if the roller volume does not return after thorough cleaning then it is likely that the roller has worn and needs refurbishing.

By taking a cradle to grave approach to anilox measurement and by gathering and recording historical data on the anilox inventory, it is possible to ensure that if one anilox from a set of process rollers requires refurbishment as a result of wear or damage, the new roller can be specified to have the same volume as the original initially had.

On delivery the printer can verify roller volume by taking his own measurement to insure that the roller is in spec before it goes to press. This should enable the same print result to be achieved with the replacement roller as with the original roller and avoid re-fingerprinting the press thus saving time and cost.

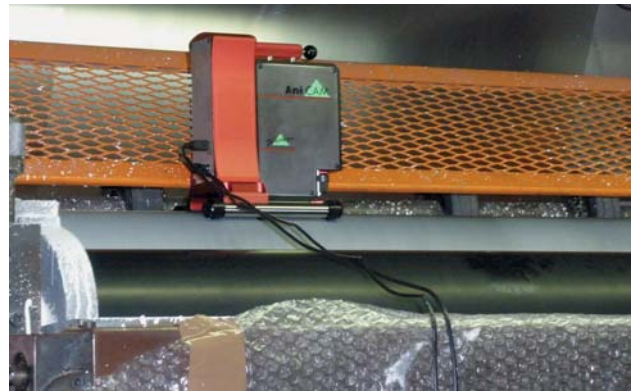


The benefits of managing anilox inventory

Many printers accept adjusting ink in order to achieve the desired print result as an inevitable part of printing but, while some adjustment may always be necessary, the total time lost is typically far in excess of what can be achieved with volume measurement in place. By quantifying the volume of the anilox inventory on a regular basis, along with good roller management, it should be possible to ensure that the anilox rollers for a job are within spec before they go to press. Or, if not, by knowing the difference between the optimum roller volume and that which is available, it should be possible for the ink management system to change the ink composition so that the minimum of adjustment is required. With this approach a significant amount of time can be saved and cost taken out of the equation.

Fairly short print runs are the norm these days and as such most printers are running in excess of 20 jobs a week on one press working a single eight-hour shift. If, as research has shown, 40% of these jobs require colour adjustment at 20 minutes per adjustment then this represents 160 minutes of lost time per press per shift each week or 24 hours of lost time every week if three presses are running on three shifts. Even if this time loss is only halved with better anilox management this still represents significant savings.

The closer a printer can get to being able to »print by numbers« the more time he will save and this not only reduces the cost of individual jobs but also increases production capacity.



The bottom line

With the right approach and effective measurement equipment it is relatively easy to monitor the volume of an anilox roller throughout its life cycle. It is improvements in roller engraving, cleaning methods and measurement systems over the past ten years that has helped to make this possible.

Any printer that achieves this has already placed himself in a much stronger position than his competitors that have not adopted volume control. However, in the total scheme of things, this is only the start of what could be a much more rewarding journey.

With similar presses working with matched process anilox rollers it should be possible for a printer to achieve press fingerprints that are within acceptable tolerance of each other. This then makes it possible to work with a single set of repro conditions for each substrate across all presses, thus increasing versatility and enabling any process job to be placed on any press. For larger printers, with more than one operation of a similar nature, it should, with the right approach, even be possible to work with the same fingerprint across a number of sites in different global locations. This would in turn be a big selling point to the multinational packaging companies who want to print locally while at the same time achieving product uniformity. Any printer that could achieve this would definitely be ahead of the curve.

One thing is for certain. None of these potential benefits will be realised without the proper degree of anilox management, measurement and control. ■

Left:
Checking anilox rolls for label printers.

Right:
Checking anilox rolls in the press.