THE ability to measure all aspects of the flexographic workflow is a critical part of becoming a competitive, quality assured converter. Alexander James outlines a practical plan of action.

Given today’s competitive environment, it is imperative in the flexographic printing industry to maximize efficiencies. This is especially important with the tight financial situation many businesses find themselves in. Improvements in efficiencies must be accomplished with thorough quantifiable procedures and streamlining of all workflow. Incorporating procedures using equipment that enables the measurement of the flexographic process and proper documentation is a critical part of assuring consistency and efficiency.

Now is the opportune time to evaluate your process, your workflow, and find opportunities for improvements that will make you more efficient and more competitive. There are an abundance of technologies available which make it extremely feasible to measure and establish tolerance for the entire flexographic process. In this article, I will review workflow going from digital file through the prepress area, including plating, pressroom, aniloxs and ink preparation. I will cover ways of adopting instrumentations that can benefit any company.

We will start with a simple example of using a target for a place to track consistency throughout each stage. For example you can have targets of 100%, 70%, 50%, 20%, 1%. Established design tolerances and parameters won’t be covered. The assumption will be that those parameters – minimum fonts, line widths (positive and negative), printable screens for achievement of quality vignettes, have been instituted. Most companies should have those tolerances in the form a design specification sheet, based on the limitations of their equipment in combination with their ability.

These targets will have measurable tolerances – and more importantly, a point of reference for troubleshooting the process from digital file preparation through polymer processing and plating.

We are now ready to review the process. Initially, when processing any job, keep
"Tracking this information you will know at what point the decrease in any volume no longer will allow you to hit a target color"

the targets with each separation. When the compensation curve is applied, track and document the actual numbers used for each curve.

Additionally, measure the targets using a transmissive densitometer after the film has been processed. If your workflow is digitally based with a direct to plate system, measure the mask prior to processing the plate. See the example below. Keep in mind this is only an example; your actual numbers may differ.

Several key points to keep in mind are the tolerance for each stage for example for film, the 1% should be +/- .5%, the 20% should be +/- 1%, the 50% and 70%, +/- 2%, and of course the 100% is 100%.

The next stage is to process the plates. For this purpose we will stick with the conventional approach and measure our targets after each plate has been processed. The thickness of the plates should be documented along with the measurement of the target. A tabletop micrometer can be used to measure the plate thickness and a variety of optical measuring devices are available that enable the measurement of tone-scale polymer targets, be it conventional or digital, as part of quantifying your workflow. Once this information is known you should always record the acceptable variance for your operation.

Going forward, keep in mind that every job should have documentation for each of these stages to assure that every separation is maintaining a high degree of consistency. The value of establishing this procedure is knowing prior to sending any plates to the pressroom for production that the workflow up to that point is holding consistent tolerances every day. Should an issue arise during production, you can now refer to the quantified workflow via documentation. This allows you to quickly draw inferences for potential areas to evaluate, plus eliminate time-consuming and needless analysis of verified workflow.

Finally, as the plates are taken to the pressroom, the printed result should be the final data that is quantified to close the loop on the workflow. Having each stage of the process measured and quantified establishes a process checklist and tolerances. This valuable information validates the consistency of each job when in production, and in addition it gives you valuable information for reference when repeating the job on a reorder.

A common misunderstanding is that quantifying and documenting should be only for process printing jobs. Every job, regardless if it has process, screens or combination work, should be recorded.

Once the plates make it to the production floor with the documented tolerances, the next area to review is the selection on your anilox roll/sleeve. Your choice for anilox specification is another crucial element for having consistency and a quantifiable workflow. Make sure you calculate the correct engraving specification that addresses your requirements for dot support, ink volume for color achievement and consistent printability. Contact your anilox supplier and ink supplier with technology that will allow you to measure the change in volume over time and will enable you know ahead of time when a volume for any anilox will not give you the opportunity to hit your desired color. You will also need an effective, verifiable and documented cleaning procedure of your anilox inventory. Working with your anilox supplier, when you order an anilox roll/sleeve you can start by tracking the anilox specification for any

<table>
<thead>
<tr>
<th>POLYMER</th>
<th>M</th>
<th>C</th>
<th>K</th>
<th>Y</th>
<th>C</th>
<th>M</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>20%</td>
<td>18</td>
<td>20</td>
<td>18</td>
<td>28</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>50%</td>
<td>63</td>
<td>65</td>
<td>65</td>
<td>61</td>
<td>61</td>
<td>63</td>
<td>63</td>
</tr>
<tr>
<td>100%</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

For example, if you have FIRST density targets for your process inks you need to be cognizant of what engravings will give you the desired density numbers. The same goes for jobs that are screens, combination, or solids. If you are printing jobs with a specified delta E tolerance, you need to not only be aware of the anilox specification that will allow you to achieve the desired color, but more importantly the tolerance for volume variation. For any given anilox engraving that delivers a specific color match you need to know at what point does a change in volume no longer allows you to achieve a color match.

Quantifying that change can be achieved numerous ways – with the help of your anilox supplier, by conducting periodic audit, and by investing in anilox measuring

for success

ABOUT THE AUTHOR:
Alexander James is a Technical Manager for Harper GraphicSolutions, a division of Harper Corporation of America, Charlotte, NC. He has a Master of Science degree in graphic communications from Clemson University, a Bachelors of Fine Art degree from the University of North Carolina at Asheville and more than 18+ years of experience in the graphics industry. James will be a speaker at the Mexican Label Summit organized by Labels & Labeling. He travels globally helping companies resolve their wide- and narrow-web Flexographic workflow challenges.
given color or a variety of process or spot colors. The certification you receive with any anilox roll/sleeve should be your starting point. If you are using additional measuring devices you should measure the roll to establish a correlation to the certification specification of your new or re-engraved roll or sleeve.

Each roll in your inventory should be documented and tracked. Doing this will give you the opportunity to establish a quantifiable workflow where it is known that if the volume of a roll or sleeve falls below a certain level, it will no longer give you the target color. For example, if you have an inventory of rolls or sleeves for your solids at 400cpi, 5.5bcm, establish a chart that shows the delta E tolerance of which colors that anilox specification allows you to achieve consistently with printable ink viscosity. Track at what point you no longer can hit the target colors. In your inventory of aniloxes, you could easily have a range of volumes that will deliver more or less color depending on actual volume. There are many instances where a color match will not be achieved when the bcm is .5 less than your specification. A .5 difference can easily be the situation when a roll/sleeve is not properly cleaned. I have measured anilox roll/sleeves staged to go into the press that had a difference of .8bcm less than the target bcm required to hit the color due to lack of proper cleaning procedures and verification.

Tracking this information you will know at what point the decrease in any volume no longer will allow you to hit a target color, then you can decide to reassign the anilox roll to a color that you should know will be achieved with the worn, changed volume.

Unless you are using the same equipment that your anilox supplier uses, your measurement not surprisingly will be likely be different. You can work with your anilox supplier to periodically conduct an audit to help you establish a wear and condition history. The value of taking the time to establish working histories will be a decrease in make-ready time, more production output of your presses and predictability in your ability to hit a color. Having quantification as part of your documentation process when struggling to hit a specific color you can pull up the data and quickly evaluate whether your current anilox choice is part of the issue. Inspecting the cells of all rolls/sleeves prior to putting them in the press should be part of standard operating procedures. Remember that an engraving that is not properly cleaned can have a volume loss exceeding the tolerance you set in your workflow.

Finally, you must document the variables of your ink for each press run. Every print job should have documented the running conditions of the ink for the total run length of the job. Viscosity and color tolerances need to be recorded. You will soon discover the variability in color that a change in viscosity of 3 or more seconds can make. For the sake of consistency, if you do not have automatic viscosity meters, you should manually measure the viscosity every half hour and document the findings.

Inks going to the press floor should have a known flow target and spectral data. This is especially important when dealing with work-off inks or excess inks. Be sure to use a spectrophotometer to track the L*a*b* values of your color to confirm your delta E tolerances are being achieved. In the ink lab you can use proofing devices to pull drawdowns prior to sending ink kits to the production floor. Taking the time to do this up front will save color-matching time at the press. Your press operators should be press operators, not ink technicians.

In summary, the entire process can and should be quantified on a job-by-job basis. This does require an investment in the right equipment needed to measure each stage of the workflow. However, the long-term benefits by far outweigh the short-term cost. Your initial investment in time and equipment will be compensated many times over by lowering costs associated with press downtime, ink waste, ink inventory, material waste and lost production. Guesswork troubleshooting no longer has a place in the pressroom in today’s competitive world, so do yourself a favor and start quantifying your workflow and reap the rewards.