




4 CRITICAL FACTORS TO PRINTING SUCCESS



The printing process is more complex than many people think. The overwhelming idea seems to be that a design is sent to the press, then that design emerges a short time later looking exactly like the original design. Under this assumption it can be difficult for printers and customers to agree on the quality of a job and what is expected. There are many components that can complicate the way a printer intends to work. When variables like inadequate equipment, ink management, quality specifications, press temperatures and inconsistent substrates all affect the printing scenario, there is no surprise operators run into down time. However, among these many different technical variables, Quantum Ink has distinguished four critical factors to achieving printing success.

1 CLEANING + PREVENTATIVE MAINTENANCE

One of the largest components in successful printing is preventive maintenance and cleaning of press room mechanics, however this practice is frequently overlooked and undervalued. In attempts to increase profits, printers may be tempted to continually over work their machinery and presses without pausing for routine cleaning. However, this effort to improve profits drastically undercuts the quality and consistency of end results. Quality of end products is what the customer expects, often demands, and is needed to retain business long term.

In fact, maintaining a regular cleaning schedule for the press is imperative to producing a product that is more consistent in color and quality, an appearance that will eliminate the need for reprints, wasted materials and labor downtime.

Unclean and clogged anilox rolls are the main culprits for poor quality printing. Anilox rolls must remain clear of residual ink in order to deliver consistent volumes to achieve the desired color to obtain a quality end product.

When magnified, the anilox are made up of tiny cells that act as small vessels that transfer ink to the plate or substrate. Unfortunately, not all of the ink in the anilox transfers from those cells onto the plate or substrate; ink tends to cling to corners and the bottom of cells. This means that with each revolution, ink remains in the anilox for the next impression.

This residual ink will be there when the print job is over and, if left unattended, it will solidify into the cells. This leads to less ink transfer due to plugged anilox resulting in weaker print quality. Other signs of an unclean or plugged anilox are:

- Sporadic print quality
- Gaps in ink coverage
- Transfer issues
- Reduced ink volume and coat weights
- Weak color strength in print density
- Inconsistent end product

Once these problems begin occurring, the anilox roll is already showing signs of being plugged. Sometimes these signs are mistaken for indications that the anilox is old and needs to be replaced, but sending the rolls to a Flexo Wash is generally enough to renew them.

The best method for maintaining the press is to engage in routine maintenance and cleaning. The anilox rolls should be checked and cleaned on a regular basis to remove that excess ink from the anilox and to prevent the build-up from occurring and obscuring print jobs.

Other advantages to regular cleaning include:

- Color control in consistent ink transfer
- Job repeatability from consistent ink coverage
- Significantly less downtime for

cleaning

- Fewer reruns of jobs and final product rejections
- Longer life for anilox
- Less scrap and wasted substrate

The entire press must be shut down when the anilox roll needs to be cleaned. However, if preventative maintenance and routine cleaning is followed, the process should be fairly quick, and printing can continue. If it has been an extended period since the last anilox cleaning, the roll

may need to be sent away for deep cleaning or for resurfacing. In this instance, production will be delayed until the problem is resolved.

Although it may be tempting to use a “band-aid” approach to fixing printing issues as problems occur, the more efficient and more economical method is to utilize routine cleaning processes. This will lead to better color consistency, estimations on inventories and finished products.

2PH + VISCOSITY

When press operators use Quantum water-based inks and report problems with their printing, the issue almost always goes back to the pH and viscosity of the ink.

Overcoming this issue starts with understanding how printing ink and pH work. Ink begins as a solid resin with a neutral pH of seven. In order to make that ink useful in printing, ammonia or a similar amine is added to increase the ink's pH to a range of 9.0-9.5. This is the ideal pH for ink as it goes through the printing process because it must remain a liquid as it travels through the bucket, pump and chambers before it coats the anilox roll and transfers to the substrate. Once the liquid hits the substrate, through evaporation and penetration, it returns to a neutral pH and solidifies to complete the printing process.

This process may seem very simple, but there are many factors that can affect the pH of the ink. For example, every printing environment is a little bit different, and the local airflow could affect the tempera-

ture and pH, causing the ink to become difficult to manage throughout the printing process. Additional factors include:

- How ink is stored and sealed
- Air exposed to the ink
- Temperature that the ink is exposed to
- Amount of sheer ink exposed
- Relative humidity of environment
- Size of ink chamber

Once ink has dipped below the optimum pH problems, such as tracking, buildup, dirty print, property issues, and a variety of worst-case scenarios will begin to take place. On the other end, inks that become too high in pH can result in slow drying causing rub issues, substrate-to-plate issues, cutting and converting problems, and bleeding and trap issues.

Once pH is controlled and in the optimum range it is now time to ensure that viscosity is in a manageable and optimum range itself. Viscosity being either too thick or too thin both can cause issues on press and hinder the entire process. Over-

ly thick ink dries too slowly, and can track through the printing press. It can also increase the ink film thickness resulting in poor rub properties and overall inferior ink appearance. Ink that is too thin dries too quickly, sticking to the bucket, pan or anilox rolls before it makes it to the substrate. If viscosity is not controlled at both extremes, it can completely derail the printing process.

When press operators see that the ink is becoming too thick, the natural inclination is to add some water to it. However, there are many problems with this action. Thickening ink is almost always caused by the ink pH dropping too low and out of designated printing spec. As the pH is falling into the 8 ranges, adding water may

temporarily improve the viscosity of the ink, but water has a pH of around 7, and adding it will only cause the ink's pH to plummet more.

Nearly all printing issues have to do with pH and viscosity inconsistencies that can be prevented simply by continually checking the ink pH. As long as the pH remains in the ideal range, water can be added as needed to adjust the viscosity. Maintaining the proper pH is perhaps one of the most important factors to successful printing, and Quantum Ink always provides customer-specific inks with the preferred viscosity and pH range indicated on each order to ensure suitable printing practices.

3 PROPER PROCEDURES

As with any mechanical process there are proper procedures to printing successfully, and when those procedures are ignored or only partially followed, it can affect the finished product.

For example, some press operators stop in the middle of a press run without handling the equipment appropriately. The press will be left off with ink sitting on anilox rolls and plates. This ink hardens and dries, making print inconsistencies and will have to be taken apart and aggressively cleaned or sent away for thorough cleaning, such as a Flexo Wash unit.

Every time there is a job change or the press stops for a long period of time, the anilox must be flushed out and cleaned, even if the job had started just a short time before. This is extremely important for the quality of the print job and for the lifespan of the equipment itself. Once the

anilox has been flushed, the entire press needs to be cleaned and receive proper routine maintenance checks.

Some printers attempt to speed drying time by adding alcohol to the ink. However, this is a terrible practice in dealing with the end product. Alcohol pushes the water and amines out of the ink very quickly, reducing the viscosity and causing the ink to dry before it even makes it to the substrate. This results in poor quality print and buildup of ink on the anilox roll that will need to be properly taken apart and cleaned. This example really highlights the problem with all additives such as alcohols, glycols and a litany of others. Quantum focuses on designing ink systems that run without the use of additives. Any time additives are used they are typically a band-aid that may give results in the short term but forces the ink system

into an unnatural state which often leads to unforeseen issues and the inability to be consistent run to run.

Another common procedural error is in the disconnect between the expectations for the printer and the actuality of the finished product. Many people expect a certain level of quality from the printing job that indicates that they do not really

understand the ways that the anilox rolls, inks and substrates work together to complete prints. There are a variety of different inks available for printing projects, and choosing the right ones for the press and for the parameters of the venture will largely determine the quality and appearance of the end product.

4 TRAINING

The way to avoid many of these common printing errors and to have a more successful application is through proper training. When dealing with millions of dollars of equipment, complicated processes and important procedures, it is little wonder that many printers do not understand it all on the first day of printing. Teaching press operators and other printers about the correct methods for using inks and printing is the foremost way to increase the quality of end products which is why Quantum Ink offers free training sessions frequently for its printing customers.

Training typically begins with a basic overview of the important parts of the printing process, including:

- Ink Management
- Press Capabilities
- Doctor Blades
- Printing Plates
- Anilox rolls
- Substrates

It's hard to expect printers to have successful runs if they do not realize all the components that must be managed to produce quality work. Without in-depth knowledge of all of the variables of both

the equipment that they are operating and the ink and substrate being used it can be a real struggle to get the dots to line up. The most popular and common seminar provided by Quantum Ink is a thorough tutorial about ink maintenance, including all the information about pH and viscosity.

"Quantum is there to connect the dots of printing through understanding the science of printing. Receiving a thorough training about the way that ink and the printing press work together is a great step toward successful printing," says Product Development Chemist, Drew Bredar.

Once these printers get a better handle on how to properly use all of their equipment, they will be more accurate, more efficient and able to provide a higher quality end product.

One of the biggest problems that Quantum Ink encounters as a seller and distributor of ink products is that its customers often do not order correctly, and this comes back to the training. If a printing project requires ink that dries quickly, the printer should request fast-drying ink rather than the regular type. However,

many printers do not think of this difference when placing an order. Printers should remember to provide as much information as they can about their projects to help Quantum select the correct ink type for them.

A similar problem occurs in color matching. No one wants inconsistency in color, whether it is due to choosing the wrong hue or adding water to the ink and affecting the viscosity. When prints emerge with the incorrect colors, they are often discarded and re-run, causing a waste of materials and labor.

Generally, these errors can be carefully avoided by training about the correct methods for color matching. All colors should be viewed under a 5,000 Kelvin light source as this is the industry standard for North America, but many printers stand in an office with bad lighting or on the press floor under fluorescent lights to determine whether or not the ink is the correct hue. Keeping a consistent lighting source is the first step to proper color matching.

Even with this encouragement to always view the colors under proper lighting, it

can still be very difficult to maintain the same hues across several printing presses or more than one print job. Good training will show the practices for hand proofing the colors on a substrate and for documenting the color as it travels through the many parts of the printing press. Following the ink as it moves through the press and tracking its every change in the ink room can more carefully replicate the process with very high accuracy.

Although there are many variables and many instances where mistakes could possibly occur when working with a printing press, having a good understanding of the process and of the equipment itself is imperative to successfully printing products. Printers and press operators must be properly trained about each factor affecting the process. Like all aspects of education, understanding the key concepts is the big secret when it comes to doing anything. Quantum Ink understands this and is focused on providing the classroom and hands on training necessary to make this a reality for all printing applications.



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