Your company has decided to purchase a new press equipped with the latest sleeve technology. What no one told you, though, is just how fragile your new sleeves can be if they are exposed to the wrong environment.

But please don’t jump to conclusions. Sleeve technology has come a long way, and it offers numerous advantages. Sleeves are lightweight, allow for quick changeovers, offer speeds in excess of 2,000 fpm, and are easily stored. These are just a few of the many different reasons why sleeve presses have become very popular, and it seems that every week a press manufacturer is coming out with a new size sleeve press. This is great for the economy, and if it helps the printing industry keep its costs down, it is an added bonus for all the players.

History Lessons

As history teaches us, we learn by doing or by someone else’s misfortune. So now, after you have installed your new sleeve press, loaded your anilox rolls, the substrate, the ink, and the plates, you are ready for production. Your new press is running great, meeting your expectations, and quality is unsurpassed. Then, seemingly overnight, quality degenerates. Slower speeds do not seem to help. You stop your run, start investigating, and find tiny blisters (raised areas of ceramic typically caused by a corrosive product under the ceramic coating) on the anilox roll.

What’s going on? You just paid dearly for a new press and anilox inventory and overnight your production has come to a halt. Your previous press with the steel anilox never had this problem, and you haven’t changed chemicals in your process.

Immediately, you call the representative from the anilox company and demand answers.

The first step is to examine the anilox rolls in question. If it is determined that blisters do exist, 99 percent of the time a chemical in the ink or cleaners is the culprit. Most ink manufacturers use concentrations of ammonium hydroxide, ammonia, or a chemical of the amine group in the manufacturing of their water-based inks, (MSDS - Figures 7a, 7b, & 7c—Material Safety Data Sheets). These chemicals—Dimethylethanolamine, Alkanolamine, and Ethanolamine—are derivatives of ammonia and used in water-based inks.

Why are these chemicals in the ink? Water-based ink is an emulsion. The resins and pigments used are emulsified in a mixture of ammonia, or other higher pH amine, and water to create fluid ink. The amines are required to hold the resins and pigments in suspension to control the ink’s viscosity. We cannot have a water-based ink without these chemicals.

These chemicals are known to corrode aluminum and other soft metals. In fact, on the MSDS, it may actually state: “INCOMPATIBILITY (MATERIAL TO AVOID). Oxidizing Agents. “May corrode aluminum equipment.”

Let us examine the typical materials used to manufacture a sleeve anilox roll (Figures 1 & 2):

- First and innermost, a thin fiberglass/composite layer, approximately 0.040 inches thick
- Second, a layer of resilient foam-like cushion used to provide the expansion of the inner sleeve for an interference fit to the mandrel, approximately 0.040 inches thick
- Third, another layer of fiberglass/composite, approximately...
0.200 inches thick
• Fourth, glued or epoxied to the layer of fiberglass/composite is a layer of aluminum, approximately 0.120 inches thick
• Fifth and last, a layer of thin ceramic, approximately 0.010 inches thick

So why the corrosion/blisters? Likely culprits are the hydroxides and amines in the ink, which penetrate or migrate through the naturally occurring porosity of the ceramic coating and attack the aluminum, causing the aluminum to corrode and blister the ceramic.

Does this mean that now you have to change ink? Not necessarily. Once the corrosive chemical is identified, a thermally applied “bond coat” can be engineered by your anilox vendor and applied to the aluminum base prior to the ceramic coating. This will most likely retard the migrating of the hydroxides and amines to the aluminum.

Is this a cure all? No. It may not stop the migration totally. It depends on the concentration of the hydroxide or amine percentage in the ink. The higher the concentration, the harder it will be to stop. There is also a chance the chemicals may seep in from the sides of the roller where only a portion of the ceramic thickness exists over the aluminum. Nevertheless, it does help. It is very important to let your anilox supplier know if you are using a water-based ink and to review ALL the chemicals in your process that may be exposed to the anilox sleeve. A little time invested can go a long way in saving you potentially huge amounts of lost time and money.

In the final analysis, if you are not wearing your rolls out before they blister, you may want to consider different inks.

Cleaning is Critical
How you clean your ceramic-coated anilox sleeve is also a big factor in longevity. You had a liquid wash system for years and never had any problems. But remember, those were all steel rollers.

Your new rolls are sleeves manufactured with an aluminum cladding. Many good “flexo” cleaners contain Sodium Hydroxide or Potassium Hydroxide. Check with the cleaner supplier or read the MSDS. Both are corrosive to aluminum and other soft metals, DO NOT USE these chemicals to clean your aluminum anilox rolls. What worked well on your steel rollers will damage your new sleeves. Even a bond coat will not protect your roll in this harsh environment.

Also, before you place your new sleeve roll into a liquid wash system, protect the ends from migrating solutions of any kind with a protective cap.

Let your anilox people know what type of ink you are using and what type of cleaning system you have. Read your MSDS on both your ink and cleaning solution. Let your ink supplier know you are switching to a sleeve press because, most likely, the sleeves will contain aluminum.
Protect Your Investment

Another item of concern is the repair-ability of these sleeves in cases of incidental damage. The answer is “they are not” due to the manner in which a sleeve is constructed. For instance, if a sleeve is dropped on its end and is damaged, it will most likely be a candidate for scrap. (See Figures 4 & 5) Notice how dented and deformed it is. Upon further examination, you will find that not only is the aluminum damaged beyond repair, but the fiberglass/composite will be crushed as well. Dropping sleeves can cause dents and crushed fiberglass. You may find they will no longer fit on the mandrels, will be in an out-of-round state, and will no longer deliver quality print.

These rolls are not conducive to repair like a steel roller. Aluminum takes a good amount of heat to become weld-able, and with the fiberglass, fiberglass resin, foam, and glue, it is likely that any application of extreme heat would be detrimental to the core.

As with the roll dropped on its end, Figures 6a and 6b depict a bolt that has been accidentally run through a press. This caused irrevocable damage in the same way as dropping the roller on its end. The bolt is pressed into the anilox roller, indenting the thin aluminum shell and also crushing the fiberglass line and foam. It may also be difficult to remove the roll from the mandrel.

There are many advantages to using the new sleeve technologies, but great care must be taken. Reading your manufacturer’s MSDS sheets, communicating with your ink and anilox suppliers, and proper cleaning and handling will save you money and costly downtime.

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