A belief has developed among printers/converters that anilox wear and scoring are necessary evils when it comes to enclosed-chamber doctor blades. It doesn’t ever have to be that way!

We know that chambers evolved from earlier ink-delivery systems to perform essential tasks during higher production speeds. They were invented to reduce solvent evaporation (VOC, HAP) and to eliminate the ink slinging that plagues many two-roll and single-blade doctoring tray systems.

Some expensive problems developed, of course, due to the fact that many converters were unfamiliar with the sensitivity of the chamber equipment and did not realize how easily the anilox rolls could be damaged. Leak issues were always addressed by applying excessive pressure on the chamber toward the anilox, which caused the blade to flex and break down. Such pressure on the anilox creates metal fragments and friction that lead to scoring and wear damage.

What is required in the assembly is precision. We all know with great certainty—after the scoring and wearing of many anilox rolls—that enclosed chambers cannot just be dropped in and run. Proper installation, maintenance and operator training are essential for the kind of success that will conquer your enclosed-chamber fears.

Clamp & Chamber Care

There are many critical factors that will spell success or doom for the whole chambered process. First, you need to understand that the chamber has to align properly with the anilox. This may seem simple enough, but it cannot be overstated! Many instances of premature wear and scoring can be prevented when a chamber is assembled and aligned correctly.

The chamber must be leveled with a bubble level. The pitch of the chamber must be set with a 0.002-in. feeler gauge so that both the top and the bottom steel blades (if they are the same depth) touch the anilox at the same time.
all across the face of the anilox. This element is less critical for wear when a plastic containment blade is used, but is still important for seal and OEM-designed recommendations for blade angle to the anilox.

Any skew to the chamber alignment leads to leaking, which will demand either proper assembly/realignment or a response of excess pressure on the chamber. We have found that the excess pressure transfers to the steel blade and causes it to break down, eventually dooming the anilox.

On older chamber assemblies, check the blade clamps for warping. Warped clamps cause a lot of leaking across the top and bottom of the chamber. Replace them if they can no longer lay flat. The chambers themselves can become twisted and worn, especially on wide-web presses. It is important that they are handled with extreme caution and not dropped.

Ensure that the chambers and clamps are cleaned properly and thoroughly after each shutdown for effective assembly later on, but be wary of corrosive cleaners, which can attack and pit the surface.

Replace those worn clamps and chambers. Brackets that hold the chamber assemblies must also be checked for wear. Brackets can become loose and misaligned over time and must be brought back into design specifications.

Seals: A Perfect Fit
Seals are an important component of the chamber system and can help or hinder the process of ink containment at speed. Above all, seals must fit perfectly in order to function properly. There is no other way for it to work. Seals that are the wrong dimension really curtail effectiveness. Ink will always find its way around openings between the seal, anilox and chamber.

It is critical to get a properly fitting seal of the correct material. The three main types of seals are foam, neoprene and felt. I have witnessed operations with all three types of seals, and each is effective in specific applications. Foam seals work best on shorter runs. Oil-soaked felt seals are cost-effective on longer runs.

Typically, foam seals are more forgiving in dimension because they are compressed to fit. They do tend to break down and tear unless properly lubricated. The lubrication must also be maintained. Felt seals have great durability but should be shaped—precisely because they do not compress and will inhibit sealing if they aren’t the proper dimension. Neoprene seals work well when intricate chamber fit is required.

No matter what type of seals you use, strongly consider running dead bands (unengraved ceramic) on the ends of the anilox so that the seals do not come in contact with the engraved area of the ceramic. The engraving acts like sandpaper on the seal, eroding it and allowing ink to inhibit the seal function.

Blades Are Key
Blades are a key part of the chamber’s function. They provide the seal across the face of the anilox and maintain a consistent ink film for transfer. Blades must be installed flat against a clean chamber surface. Dirty chambers won’t allow the blade to seat in the chamber assembly.

When the clamps are installed, tighten the clamp screws from the center of the chamber outward to prevent blade buckling and waves. Make sure the blade stays flat and flush against the chamber throughout the installation process.

Blades should be cut so that the ends rest in the middle of the seal, not extend past it. Doctor blades that are too long defeat the seals’ ability to function and allow ink to travel to the ends of the chamber.

Do not allow operators to flip the doctor blades to use the other side. I have seen this occur many times. To save a little money in blades, the anilox—representing the greater investment—ends up being destroyed.

There are many types of blade materials, thicknesses and tip styles to choose from. Everyone has different reasons for liking a particular style, but no blade will function well without proper installation. Used doctor blades testify to the problems associated with poor chamber assembly and alignment. Extreme wear in the middle of the blade commonly identifies alignment and pressure troubles. Blades with uneven wear from one end of the chamber to the other signify a leaking issue on the worn end. Blades reduced by excessive wear generate the metal slivers that load inking systems with the means to destroy anilox cells.

Operator Skill
Perhaps the most ignored aspect of the enclosed chamber system is the level of skill at which the equipment is utilized. Proper instruction on every step of assembly and installation is well worth the small investment of time and money spent.

Employees charged with this press responsibility must learn how to put together a chamber and align it correctly, as well as how to diagnose problems relating to any of the components
and repair them properly. Enclosed-chamber training must accomplish one critical achievement to be successful: standardize the procedure for the whole facility. Emphasize this goal in the instruction documents.

This type of training is most effective before poor habits—such as over-impressed chambers and poor maintenance—are developed. A formalized program is the best approach to ensure that everyone gets the same education. Time will be well spent in the classroom for something this important.

Testing and skill demonstration should also be a part of the process to certify anyone involved with chamber assembly and installation. Management and production personnel must have a firm understanding of the procedures and the financial impact of poor execution.

Failure by just one employee to follow the proper steps can cost a converter lost production time and thousands of dollars in damage to anilox and chamber. Lack of skill development will continue to plague printing companies in downtime and damaged equipment until training issues are addressed. Anyone affected by time management and tight budgets cannot ignore this aspect of chamber assembly.

**Banishing Frustration**

In summary, any chamber that leaks instantly after setting is a red flag for many potential causes, including misalignment, wavy blades, warped blade clamps and poor seal quality, fit or structure. Do not allow used chamber assemblies with worn blades to be reused, as they will always leak and require too much pressure to seal. Instead, they must be rebuilt to allow for proper alignment.

Maintenance is a critical component of success with chambered systems. Take the time to put together a maintenance program for all aspects of the heart of the printing process. I have been asked many times how long aniloxes should last by printers who are frustrated by their experiences and skeptical of enclosed chambers. I always tell them that I have seen anilox rolls last for seven years in great condition on chamber assemblies meticulously maintained—and for seven minutes on chambers that were not performing due to chamber installation troubles.

Don’t let frustration rule the day; get the help you need to overcome your fear of enclosed chambers!

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ABOUT THE AUTHOR: Sean Teufler is technical graphics advisor for Harper Graphic Solutions, a division of Harper Corporation of America, Charlotte, NC.

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