

WHAT EVERY PRINTER NEEDS TO KNOW ABOUT RECLAIMING

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It's a tossup if the ink room or the reclaiming area is the worst place in the shop. It's usually dark, dirty, loud, wet, and really ugly. Nobody wants to work back there, and those who are assigned tend to be the lowest paid and have the highest turnover. This month I wanted to share some ideas about reclaiming and what this area *could* look like, instead of what it *does* look like.

Let's start with a basic question: "Why reclaim at all?" Wouldn't it be easier just to library the screens until we need them again or just cut the old mesh out? This is Old World thinking. There are certain situations where a library still makes sense, but it is getting harder and harder to justify. A library takes up a lot of space. It is also expensive when you consider the cost of space, frames, fabric, and the number of times you pull a job, set it up, and find that one or more of the images is damaged or out of register. The impact on print quality and lost productivity is quite high. Anyone who has run the numbers will testify to that. It is very deceptive just how expensive a library really is.

If you couple this aspect along with the characteristics of polyester to be dimensionally unstable and subject to coldflow, you have another reason to reclaim images. No matter how good the polyester, it is subject to image growth and tension release over time. A stored image changes size. If a set of screens includes different ages, the rate of image change is different for each color. This is why screens left on a shelf very often do not re-register on the press. New frames are much more prone to coldflow than older screens. You also have the issue of differing mesh tensions which affects your setup and running efficiency of the press.

The third reason is simply the cost of the asset being stored. With a retensionable frame and high mesh count plain weave fabric, the investment per screen can be \$50 - \$100—or more—for each frame sitting on the shelf. Economics dictates that we use the asset to its fullest in order to return our investment.

Reclaiming is a prerequisite if you are using retensionable frames. The mesh must be retensioned between runs to compensate for coldflow related tension loss and image size change. It is a fact of life. As the frame is used, recycled, and re-imaged, the mesh stabilizes and coldflow diminishes. The final step is known as work hardening. This is where the mesh now retains its tension and size characteristics over a long run, or long period of time. This is what all printers should strive to achieve for each screen.

Unfortunately, it is difficult to get to this stage, especially with finer meshes. The screen usually falls victim to an early demise due to rough handling and aggressive reclaiming chemicals and procedures. Most printers do not realize that the value of a screen increases with time as the mesh stabilizes. This means that the older a screen is, the more reclaiming cycles are on the mesh, and the more valuable that screen is to the printer. With this in mind, we should rethink how we treat these screens.

Welcome to the pit

Reclaiming does not have to be as ugly as it is. Begin treating it with respect and dignity, and the quality of your printing will improve. The bottom line also improves as you waste less fabric and spend less time stretching screens.

The early chemicals and methods used to reclaim screens were harsh and primitive at best. That is all changing today, thanks to advanced chemistry, new equipment, and a new environmental awareness.

The older chemicals were dangerous, toxic, caustic, and smelled really bad. Many of them were based on sodium hydroxide, also known as caustic soda, or lye. These reclaiming agents were so strong that they would literally dissolve your flesh if they were spilled on you. The skull and crossbones on the label was a true indication of what you could expect for careless handling.

Mesh filaments are attacked and weakened by these chemicals. Exposure to sodium hydroxide makes them brittle and weak. The result is premature failure, either during reclaiming or on the press during a production run. If the mesh is stretched aggressively and not allowed to rest between tension applications, the chemical exposure is even more serious in accelerated degradation of the filament.

Effective reclaiming consists of two main objectives. The first is the total removal of all old stencil emulsion and any image that may be on the mesh. The second is to prepare the clean mesh for the new stencil. The mesh must be free of residual emulsion, ink, solvent, grease, oil, fingerprints, or any other contaminants. Special care must be taken to insure that there is no "ghost image" from prior printing etched into the polyester. This causes the new emulsion to repel from the mesh, and ultimately leads to premature stencil failure and a poor image reproduction.

Screen printers commonly use 500 and 1000 psi pressure washing equipment to reclaim their images. While this may be good equipment for the local do-it-yourself car wash, it is inadequate for the job at hand. This is one piece of equipment that is rarely taken seriously, and often breaks down. As we discuss the mechanics of stencil reclamation, the importance of this piece of equipment will become very apparent.

High pressure reclamation is imperative for successful screen recycling. When we speak of high pressure sprayers, the operating pressure is about 3000 psi and they utilize no more than 3-5 gallons of water per minute. Printers that have never used pressure this high are often intimidated, fearing they will rip their screens. If your screens are of low tension, this can be the case. The initial shock of a high-pressure blast can cause mesh to rebound, bursting in the process.

If your screens are over 20 N/cm, there is little danger of damaging the mesh. The higher the mesh tension, the greater the stripping action of the water. The combination of high mesh tension and high water pressure guarantees that you will use less reclaiming chemistry on the polyester. There are two benefits here. The first is

the savings on chemistry and the second is that the less chemical contact with the fabric, the longer the fabric life. Some chemistry is desirable, but the amount you need is very small.

New chemistries are based on a two-step approach. The first step is to apply an ink degradant. This chemical bonds with any residual petroleum-based materials in the screen and renders one end of the molecule water soluble. This is important because it allows us to strip away any inks or wash up solvents clinging to the mesh. Before using the ink degradant, be sure to remove as much ink from the screen as possible. There should not be blobs or puddles of ink in the corners. Clean all ink off the framebars and from the squeegee area.

The second step is to apply stencil remover. This water-thin agent dissolves the PVA/PVOH, the resin component of the emulsion. There is a tendency to use far more remover than is necessary. Let the chemical do the work. Putting mass quantities on the screen will not necessarily speed things up. The key to economical reclamation is to wet the screen, apply a small amount of reclaiming agent, allow one to two minutes for the remover to work, and wash out with high-pressure water. With new chemicals on the market it is possible to use as little as .75 oz. of ink degradant and .75 oz. of stencil remover per 23" x 31" screen frame. This is a typical size automatic frame.

While we are on the subject of chemical application and reclaiming, there is one other observation. In almost every shop that I have visited, the person reclaiming the screens will randomly aim the high-pressure washer at the frame. It is important to start at the bottom of the screen and work your way across and up the screen. This allows the reclaiming chemistry to continue working on the unreclaimed areas. If you start at the top

and work down, the wash water dilutes the chemicals and effectively stops the reclaiming process. This results in more time to fully remove the stencil and slower productivity in the reclaiming area.

At the start of the high-pressure wash-out, begin with the gun about a foot away from the screen and bring it in toward the screen until the nozzle is about 1-1/2" from touching the mesh. This concentrates the high pressure. The pressure drops off dramatically as you move the wand back. If you accidentally touch the wand to the mesh, there is an excellent chance that you will burst the screen. As long as you start with low pressure and move in with greater pressure, you should be fine.

At this time we should focus on ghost images. Even with the best reclaiming chemistry and the highest pressure, ghost images can be a problem. The number one cause of ghost images is improper wash-up solvent. It is very common for screen printers to use lacquer thinner, acetone, or MEK (methyl ethyl ketone) to open the screen mesh if they have flash dried ink in it. They will also use strong solvents to remove the plastisol. The main motivation is that it is very fast and appears to leave a clean mesh. The problem is that solvents with ketones in them will "freeze" the emulsion—and often the ink residue as well—in the mesh. No matter how diligent you are with high pressure, you will have only limited success in reclaiming the screen. This will necessitate the use of a ghost and haze remover which can seriously weaken the mesh. Remember, if you use a mineral spirit based solvent to clean the screens, you will not freeze the emulsion and ink. If you should have a ghost image, there are safe, nontoxic de-ghosting chemicals available that won't hurt you or the mesh. If you have used a ketone-based solvent, you must resort to old-fashioned sodium hydroxide based dehaizers.

While new reclaiming chemicals are more expensive than their older counterparts, they offer significant advantages. These include:

- 1) Noncaustic and very low toxicity. Will not harm you or attack the screen mesh.
- 2) Requires very small amounts of chemical to reclaim the screen. Typical screen requires less than 2 ounces to do the whole screen.
- 3) No solvents or other Volatile Organic Compounds (VOCs).
4. Drain safe. While it is never a good idea to dump chemicals into the sewer or septic system, these materials are the safest to date, and even pass California's tough standards.
- 5) No harmful vapors.
- 3) Hearing protection in the form of earplugs or ear muffs is mandatory.
- 4) A splash apron that is water-repellent is very helpful.
- 5) Rubber boots or a raised grated surface will keep the operator from getting wet feet.
- 6) Make sure that all electrical connections are GFI protected. This is a special type of circuit breaker that will disconnect the current if there is any type of water—or moisture—related electrical short circuit .
- 7) Never point or touch the high pressure end of the reclaiming gun at any body parts or any person.

There are a few safety tips to also consider when reclaiming.

- 1) Even though the new chemicals are less toxic and less caustic, always wear rubber gloves when processing screens.
- 2) Eye protection is mandatory. Splash goggles are the best. Wearing these reduces the danger of flying emulsion or splashing chemical into an operator's face.

Screen reclaiming is definitely not the most exciting part of this business, but it is important and usually overlooked. It doesn't get the respect it deserves, and consequently a good portion of screen-related failure, stencil-related failure, and screen breakdowns can be traced to the reclaiming area. The good news is that new chemicals and equipment can minimize negative aspects of this job.