Automatic Results

BY JOHN MURRAY

Automatic Screen-Cleaning Equipment

If you've recently expanded your operation, you're probably aware of the many recent high-tech advances in screen printing: faster, more sophisticated presses at lower prices; direct-to-garment printing; LED exposure systems; advances in preregistration systems; and more. Even if you haven't added any new equipment in the last decade, it would be hard not to notice the headlong drive to automate.

Screen-making existed in a backwater until the advent of computer-to-screen imaging and exposure systems. At first, screen printers were hesitant to adopt the technology, but once the benefits became apparent the rush was on.

Like screen-making before it, screen cleaning continues to exist in a backwater, both figuratively and literally. There are clear and quantifiable advantages to automating those processes—as well as some not-so-obvious advantages—but many shop owners give little thought to this out-of-sight, out-of-mind aspect of screen printing.

But, really, is there anything wrong with the manual process of reclaiming screens? Well, not if you like a corner of your shop decorated with ink-spattered walls, soothed by the sound of power sprayers, punctuated by runaway humidity, and tinged with a strong chemical odor. There's a reason shop owners don't show off their screen-cleaning operations.

At this point, you're probably thinking, "Sure, it's messy, noisy, and a little unpleasant, but why would I want to invest in automation when I have a couple of low-wage employees getting the job done?" Well, they may be getting *a* job done, but it's unlikely they're getting *the* job done, unless quality, speed, and efficiency aren't important to your operation.

The quality of your prints starts with the quality of your screens, and everyone who touches those screens plays a role in what you ship to your customers. The people who work with your screens play a role in the longevity of those screens, and screens treated with care last longer and perform better.

As computer-to-screen imaging and exposure systems with their ability to quickly create new screens become the norm, the tendency to hold and store imaged screens for future repeat jobs is likely to diminish. The upside is an operation that requires fewer screens, less storage space, and less labor spent storing and retrieving them. The potential downside is that the mesh on a screen will likely see more use over a given period. However, the issue of wear and tear can be significantly mitigated by careful screen cleaning and handling.

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THE ADVANTAGES OF AUTOMATED SCREEN CLEANING

Automated processes reduce labor costs. This also frees up the employee operating the machine to perform other tasks during the clean/rinse cycles.

Direct digital control of volume, pressure, and duration yields consistent results whereas manually-cleaned screens often require follow-up rinsing or scrubbing because of incomplete or inadequate processing due to operator fatigue, boredom, or insufficient training. Processing can also vary from one operator to the next. The balanced pressure and even application provided by simultaneous sprays from both sides of the screen clean consistently and help maintain screen tension and an extended screen life. Consistency is further improved with user-programmed sequences that can be called up for various screen-cleaning scenarios, enabling operators to quickly and consistently clean any screen, emulsion, or ink in one simple step.

Automated systems also arguably reduce the environmental impact from recirculating screen-cleaning chemicals, as well as lower these operating costs. The precise application of cleaning chemicals instead enhances the cleaning process and reduces overall chemical usage. Going along with this is the reduction in water consumption from applying the precise amount of water necessary to clean screens. Automated screen cleaning can reduce water use by as much as 50 percent, while some systems reportedly reduce costs further by recycling water used in the wash cycle. The fully-enclosed screen-cleaning chambers also keep the area clean while minimizing noise, humidity, and exposure to screen-cleaning chemicals improving workers' experiences as well.

THE PROCESS

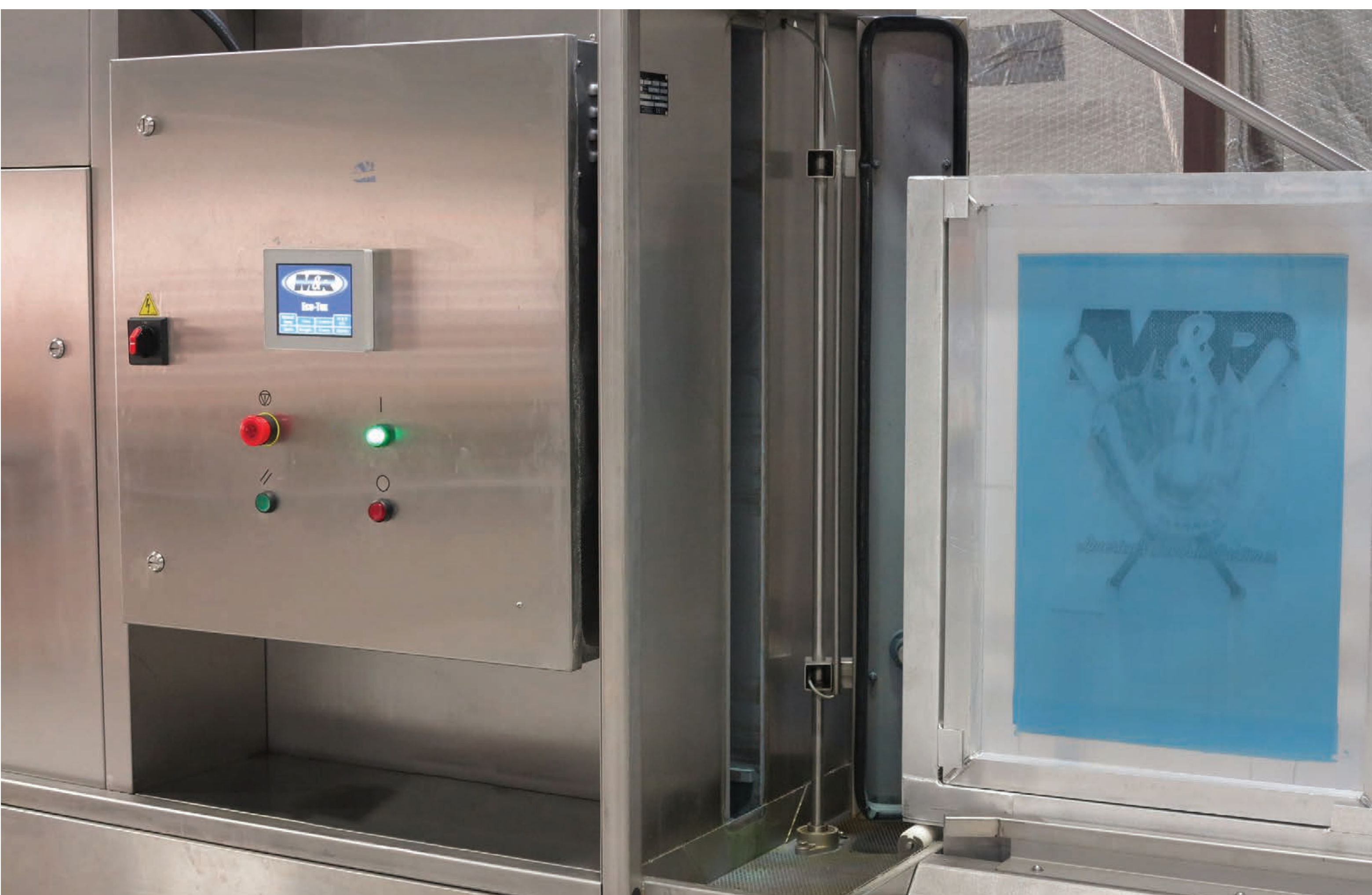
There are four basic steps in the screen-cleaning process:

1. Ink removal
2. Emulsion removal
3. Removal of haze, strains, and ghost images
4. Degreasing

Only when all four of these steps have been performed successfully can a screen be considered clean.

With an automated screen-cleaning machine, the process looks like this:

1. At the start of the shift, or the close of the previous shift, the operator makes any necessary adjustments to the machine's chemical balance.
2. The operator scrapes off bulk ink and removes any tape from the screens before loading the screen(s) on the in-feed rack. Then, the operator initiates the cleaning process. At this point, the operator can continue removing bulk ink and tape from other screens or leave to perform other duties.
3. The machine sprays a solvent/water mixture under low pressure. Then, it allocates time for the mixture to soak in and the remaining ink and chemical solution to drip into the catch basin from which it can be periodically removed. Now, most of the ink will be gone.
4. Next is the application of clean water through opposing high-pressure nozzles. Duration varies according to emulsion type. The pressure removes the softened emulsion without stretching the screens as is the case when scrub-



Screen cleaning and reclaiming is a crucial step in achieving quality prints. (All images courtesy M&R)

bing screens with brushes or blasting water from one side with a handheld sprayer. The water/emulsion mixture is sent down a separate drain as graywater. Ideally, the system should have the ability to send emulsion straight to a graywater drain. Emulsion directed to a holding tank quickly turns into a sludge that can be tough and time-consuming to remove. When considering a system that directs emulsion to a holding tank, the cost of the tank-cleaning procedure should be factored in to the overall costs and productivity of the screen-cleaning operation.

5. Air blowers remove water from the screens before they're moved out of the cleaning chamber and treated with a chemical degreaser. The entire process typically takes less than five minutes, enabling a single operator to clean approximately 180 screens per eight-hour shift.

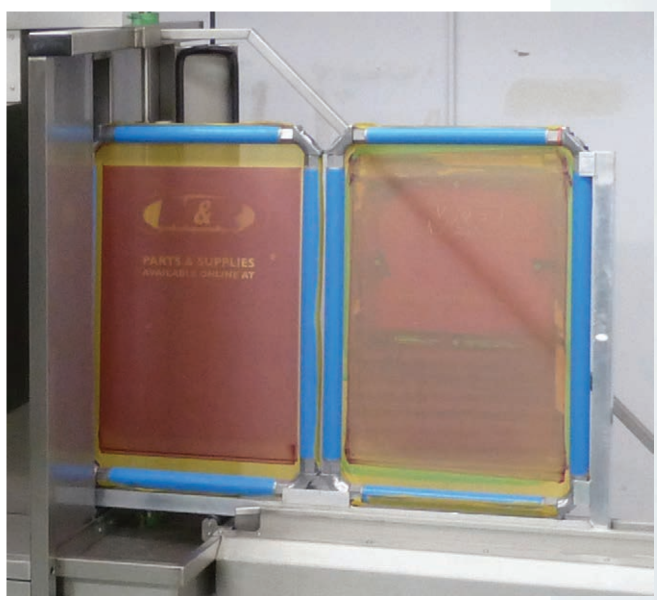
THINGS TO LOOK FOR IN AUTOMATED SCREEN-CLEANING SYSTEMS

The screen-cleaning system needs to do a thorough job of reclaiming screens. If it can't remove ink, emulsion, haze, stains, ghosting, and grease quickly and completely, you might as well stick with the manual approach. At the same time, the machine needs to be gentle on screen mesh.

To maintain efficiency and prolong chemistry life, it's beneficial to have a machine that features a programmable system for injecting a user-set dose of the solvent to keep the cleaning solution at optimal strength. The user can program dosing based on the number of screens that have been washed or the number of days that have elapsed. In more sophisticated systems, this data is automatically tracked.

One of the underappreciated advantages of automated screen cleaning is the reduced chance of distorting mesh, not to mention the likelihood of blowing out screens entirely. The high-pressure emulsion-removal cycle needs sets of nozzles that are directly opposite and which spray water at equal pressure and volume.

The machine should also be easy to operate and simple to maintain. Ideally, the operator interface should include the ability to adjust settings like time, pressure, and volume into individually-named programs that can be recalled for the cleaning of similar mesh/ink combinations without operators having to refer to cheat sheets or change settings from memory. If automatic settings aren't available, diligent notetaking is necessary.



This particular system uses a frame for processing two screens at once to help speed up the process.

Since not all cleaning agents are created equal, the manufacturer should be prepared to recommend specific chemical cleaners and chemical-to-water ratios

The screen ink and emulsion have been removed, and the mesh is dehazed, degreased, and ready for re-coating.

that have proven to be effective with the maker's screen-cleaning system. Although there may be some trial and error involved in fine-tuning the chemical/water ratio and cleaning time to suit the needs of any given shop, operators shouldn't have to sort through all the available solvents to find one that produces excellent results under a variety of conditions.

The manufacturer should be able to provide per-screen water consumption and chemical costs, as well as the average number of screens that can be processed in an eight-hour shift.

It also pays to look for a manufacturer with a reputation for providing a high level of customer support—and for standing behind its equipment. In fact, there's an argument to be made that this should be the first thing to look for in any piece of equipment.

Finally, the decision to invest in an automated screen-cleaning system is one that has to be made by each operation based on available funds and its vision for the future. However, three things are clear: labor costs are not going down, customers are not going to start demanding lower quality, and automation will continue to be one of the best ways to succeed in a highly competitive world. pw