

Evaluating your ink blending needs

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When trying to customize your color needs, an automated ink blender is a viable option. The decision of whether or not to acquire this option can only come through evaluation of your own printing needs and an evaluation of current ink blending equipment. Once you have completed this self-evaluation and ink blending equipment evaluation, you will be familiar enough to know if you need an ink blending system and which type suits your needs.

Plant evaluation

Initially, a self-evaluation on the inks you use must be completed. How many suppliers do you have and what performance level of ink are you buying? Do you have a single source or a major and a minor supplier? Is yours a plant that cannot say no, purchasing ink from four or five ink suppliers? Also, what performance level do you purchase? Most ink suppliers have two or three performance levels of ink, ranging from brown box inks to display inks. Eventually, you will have to consider if one supplier will be able to handle all your ink performance requirements in the future and what your performance needs will be in regard to the ink lines you would carry if you were to blend. At this time, I am not sure that you could or would want to mix bases from several suppliers in a blending system (you can with some systems).

You also have to consider your ink inventory. How many GCMI colors versus special colors do you use? This will be important in that your savings will be much greater in blending special colors, more so than in GCMI's. So if you have more special colors and smaller quantities in those colors, you're more of a candidate than a person who uses large volumes of GCMI colors. Also, how much inventory do you have, and is using up your ink inventory always been a problem due to leftover or obsolete inks? An ink blender will help alleviate this in the future only if managed properly, if your supplier does not help you already with work-off.

Another major consideration is quality. Do you have many requests for color matches? Is there a demand for holding that color closely and being very consistent through a run and from run to run? Is the customer requiring a quality check or control of some sort to keep the color within range? With the proper equipment and training you will be able to perform all of these functions in your plant.

Another point to think about is your ink supplier's proximity. Do you require short lead times? Is lab assistance an important requirement? Are new orders and the quantity to be ordered continually a guess? Also, do you have ink-related downtime due to washed out colors or color matches that require pulling a job and sending ink back or having new ink sent in to meet your demands? Would being able to handle these problems immediately, rather than setting them aside, be a great value to you? Experience has shown that amounts of ink can be controlled very closely and press-side ink-related problems are readily handled in-house with the proper training or a trained ink technician on site.

If you could control all of the aforementioned aspects would the confidence placed in you by your customer be increased? Would the customer start to see you as a more full-service supplier, being able to respond quicker and not having as many excuses for prolonging deliveries as you may have in the past? Weighing all of this, you may be able to speculate that blending your own ink could solve several of these problems and gain this extra confidence in your operation by your customer. In today's ISO, TQM, SPC world your customer will appreciate the control you have gained and the variables that are eliminated. Summarize cost justification of savings potential vs. equipment options by adding up savings on

- Inventory
- Work-off
- Waste
- Downtime

Add back equipment, manpower, space, insurance, and electrical costs, etc. for a complete picture of the financial impact on your process.

Equipment evaluation

Now, after having completed the self-evaluation and determining that ink blending might be for you, studying the ink blending equipment available is your next step. You will find that there is a full gamut of options available from very manual systems to very sophisticated computer-controlled blenders. Similar to purchasing other equipment in your plant, you will have to determine if automation pays for itself or if you can afford the labor to do it manually. Another factor to consider is

computerization. Do you have the technical skills to deal in the world of color science? Chances are that if you are already producing high-level multicolor graphics you have the necessary skill levels within your plant to operate an ink blender, understand ink blending, and understand color science. You can either have a system that is a satellite to your ink maker and just follow their directions, or you can have a self-contained unit with a color computer, spectrophotometer, and automated blender as a stand-alone ink blending unit. You will also need to consider if you are going into a leftover ink or reused ink situation that takes a certain amount of understanding and commitment just to perform this function. You will have to decide how much of an ink manufacturer/chemist you want to be.

Blenders are available both from ink manufacturers and machinery manufacturers. Whom to purchase the equipment from is a strong consideration. If you purchase your unit from an ink company, they will more than likely want to be your supplier and would more than likely offer to be your backup blender if a problem arises. In most cases, you would have very strong ties toward this supplier to be able to make a commitment. On the other hand, if you purchase from the machinery manufacturer, you have no commitment to an ink supplier and can purchase from any supplier that you want. There is a question in this arrangement as to who provides the technical backup such as formulation, color matching, and computer databases. So, much like when you purchase other equipment, do you want to hold one party completely responsible for the entire process or do you have the necessary wherewithal to be the general contractor?

Another consideration that may or may not be important to you is whether your system is gravimetric or volumetric. This is a very strong point of contention between the two systems. Gravimetric is a system that dispenses and weighs each component individually in order. Volumetric measures the volume being delivered by pulses measured by an encoder. All components are delivered at the same time. In your study of equipment you will want to convince yourself of the accuracy of each system. Have the machinery manufacturer demonstrate their capabilities, possibly by matching colors. For a more detailed explanation of each system, see the attached sidebar "Comparison of gravimetric and volumetric dispensers."

Regardless of the method of dispensing, proper selection of equipment for your process and needs will minimize or eliminate weaknesses in one system vs. another. The emphasis on optimizing your plant's performance will demand a system and a supplier with coordinated products and services. Do not buy

any system without that assurance of performance in your plant.

The type of vessels used by the system and their circulation and agitation are also key points in the decision-making process. Some systems have captive containers; that is, containers that the ink company ships the ink in and are returned to the ink company and any leftover ink is credited. Some run directly from 55 gal drums with drums being disposed of once empty. Some vessels are larger than 55 gal, which require pumping from one container into another so that there is always enough in the system to process an order. Computerized ink inventory management will alert you to inventory levels. So, if drums are a problem or reshipment is not to your liking, permanent vessels can be used along with some sort of disposable container. All types must be hooked up to an agitation process and also a circulation system has to be included to keep the bases moving, not allowing them to settle.

There are also environmental issues to address. Although I talk about this last, it has to be a prime consideration if strict enforcement is in place in your area. This may then dictate the type of vessels you would use and the method of installation to have the least amount of waste and wash-up in your matching and blending process. This is also a good time to talk about a work-off program. With our blender you will be able to work off leftover and obsolete inks by measuring them with the spectrophotometer, if you A) have one, and B) are trained to use it, or C) your supplier does this for you. Families of inks can be combined together and the resulting mixture can be read by the spectrophotometer and placed into your base supply and the program will evaluate it as ingredients in all future color matches until used up. If your plant has some sort of waste water system, the installation can include capturing all waste water created and transferring it into a holding tank to be used either in your starch system or disposed through your waste water system.

Once you have completed your self-evaluation and ink blending system evaluation you will be familiar enough to know if you need an ink blending system and which type suits your needs and economic situation. A thorough ROI calculation of real and variable costs will determine the ultimate viability of an ink blending system as either a contributor to a decrease or increase in process improvement costs or ink costs in your plant operations. 

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(see sidebar next page)

Comparison of gravimetric and volumetric dispensers

Gravimetric dispensers

Strengths

- Accuracy. Accuracy is ± 0.001 lb, dependent on the resolution of the weigh scale on your system. If the scale is accurate, the system is.
- Immune to variations of fluid properties such as foam or temperature/volume changes. Dispense accuracy is immune to small variations in specific gravity. Allowing a wider range doesn't require as close of a manufacturer's specification by the ink company or recalibration of volume coefficients. Note: Solids, pigment concentration are vital to formula and color accuracy in any dispensing situation.

Weaknesses

- Production speed does not improve. Each fluid dispensed singly onto a scale. This basically duplicates the action of a human and a scale but with more accuracy and without corrections. Very small quantities, i.e., less than 1 qt, are difficult to produce.
- Typical production times:
5 gal, 4 items = 4 min
55 gal, 4 items = 11 min
- Range of operation. Range is limited by the weigh scale's resolution and capacity. Multiple scales are required to provide both the proper resolution for small dispenses less than 100 g and the capacity for large, over 500 lb, batch production.
- Susceptible to error. Scales can be influenced by vibration, air turbulence, lack of scale calibration, and variance in liquid flow rates. Scales should be calibrated regularly, requiring less than a minute.

Volumetric dispenser

Strengths

- Accuracy. The accuracy is better than 2% by total batch volume with ability to dispense as little as 0.001 lb, dependent on volumetric variations of blending ingredients.
- Range of operation. Capable of large or small dispenses without sacrificing resolution.
- Production speed improvements. Volumetric dispensing allows all fluids to be metered and dispensed simultaneously. This results in an increase in production output. Small quantity items are initially blended in due to turbulence, but still require a mixing cycle.
- Typical production times:
5 gal, 4 items = 2-3 min
55 gal, 4 items = 9-10 min
- Compatible with gravimetric formula systems. Gravimetric units and formulas are easily translated to a volumetric output via specific gravity.
- Verifiable gravimetrically. A cost-effective and comprehensive Q. C. can be accomplished by weighing the batch on a normal scale.

Weaknesses

- Dependent on the fluids being metered. For volumetric operation, the fluid's specific gravity must be controlled in production. Ink maker's quality has to be consistent. Wide temperature fluctuations must be controlled. Materials cannot change specific gravity.
- Requires periodic calibration. Requires calibration to compensate for pump output characteristics. Calibration is usually performed quarterly. This is a simple operation and can be performed automatically through the use of intelligent weigh scale.