

ACTEGA Kelstar Technical Bulletin

Controlling Conductivity

This is probably one of the most critical concepts for the everyday printer to grasp. We all know that once freshly mixed fountain solution is run through the press and comes into contact with ink and paper that conductivity will begin to rise. This is due to the calcium carbonate in paper that is used to brighten recycled paper pulp. In addition, different pigment flushes in the inks, mainly magentas and cyans, contain high amounts of calcium as well. Here we discuss how to control the constant rise in conductivity and more importantly, what not to do.

Two Common Misconceptions for Conductivity Reduction

- **Adding Water to Reduce Conductivity -**

Yes, adding water to your circulation tanks will reduce the overall conductivity in the tank. However, this addition of water actually will have a negative affect on the fountain solution performance. Adding water is acting as a band-aid in that you are diluting the amount of dissolved calcium in the water and thus bringing the conductivity down. The additional water also dilutes the working dosage of etch and reduces the amount of desensitizing salts, gum concentration and buffer acids that are all crucial to clean restarts and minimizing pH drift. In the same respect, your alcohol replacement dosage gets weaker too, resulting in higher water dials. Alcohol replacement raises the viscosity of the water for better throughput and emulsification of the ink, and the addition of water neutralizes this effect.

- **Adding Alcohol to Reduce Conductivity -**

In the same way as water “dilutes” the fountain solution, alcohol will do the same thing but act a bit differently. It carries a conductivity of zero, so the more you add the more the conductivity will decrease. However, adding

too much alcohol can cause issues as well. While it will keep the viscosity of the water higher and lower water speeds, it will also increase the interaction of the solution with the ink and could lead to over-emulsification. In addition, a solution that becomes too high in viscosity can cause tacking, picking and piling problems, not to mention it raises the overall VOC output of your pressroom.

Why the Starting Conductivity is Higher

Fountain solutions have gradually risen in recent years with regard to the starting conductivity. About 20 years ago, a normal conductivity was around 1,000 mmhos. Around the mid 90s as fountain solutions became more complex with all their additives, this number rose to around 1,500-1,800. In today’s world, it is not uncommon for a conductivity to start around 2,300-2,600 mmhos. The reasons for this are quite simple, actually.

- **The Elimination of Alcohol -** Most printers for some time have been running without alcohol. When alcohol was used, the need for large amounts of gum and desensitizers was not needed because alcohol partially masked plate sensitivity. However, with the combination of alcohol phased out and poorer metals used in plate making, the need for the extra desensitizing agents brings with it an increase in overall conductivity.

- **The Increased Use of Recycled Paper and Ink -**

The increased calcium carbonate filler in today’s paper, as well as the calcium content of some ink, generate the need for different additives as well. Certain calcium “sequesterants” that minimize calcium that is leached into solution, higher pH founts that minimize interaction with high pH stock, and larger buffer systems, all increase a solutions starting conductivity.

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•**The Move to CTP Plates** - The switch from conventional negative plates to CTP plates has created more of a need for increased desensitizing. While conventional plates are more durable and less susceptible to sensitivity, they are labor intensive and time consuming to process. Therefore, CTP plates are used because they can be made quicker and offer more flexibility with digital curves. They do, however, have issues with sensitivity and image loss, and need a larger amount of desensitizers to run cleaner, longer. These extra desensitizers increase conductivity.

•**Solutions to Minimize Conductivity Rise**
It is not uncommon for a printer to change waters once a week or once every 40 hrs of press time, but since it is not possible to stop conductivity drift, here are some things to try to extend the life of your solution.

•**Run Less Solution in the Tank** - While your tank may hold say 30 gallons of fountain solution, you can speed up the replenishment and bring fresh solution into your tank quicker by filling up with say 15 gallons of fountain solution. Then you fill a jug with water or put a weight in the tank that will displace the water level and make the circulator think the tank is actually full. This allows for less contamination, and more fresh fountain solution to be introduced on a daily basis.

•**Deglaze Rollers at Least Once a Week** - A good roller maintenance program that includes several roller conditioners and deglazers will pull a large amount of embedded calcium out of your rollers and will allow for less contamination of freshly mixed solution.

•**Run at a Higher pH and Phosphate Free** - Running a fountain solution with a higher starting pH will minimize interaction with paper stock. It is not uncommon for stock to range from 7.5 to 9 in pH, therefore running a pH closer to 5 will help with less calcium pulled from the stock to your tank. Phosphates also create a problem. While they are great cleaners for keeping the non-image area clean, they react readily with calcium to form calcium phosphate and become embedded in rollers and plate graining to cause sensitivity, blinding, and glazing.

•**Run Fountain Solution with a Calcium Scavenger**
Many ACTEGA Kelstar fountain solutions contain an additive that buffers the leached calcium and can prolong the life of your solution.

•**Switch to RO Water** - Test your "city" water first, and if it is over 400mmhos on a consistent basis, you can send a sample to be tested for hardness. All untreated water contains some amount of calcium and magnesium ions, and depending on how hard your water is, it could play a small part in the problem.

Contact ACTEGA Kelstar at 856 829 6300 or info.actega.kelstar@altana.com for additional information or technical assistance.