



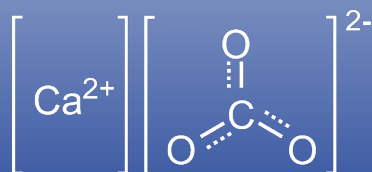
### IN THIS ISSUE:

How the printer can minimize calcium related problems.

2

Maintenance products to help eliminate calcium in rollers and press water systems.

4



## CALCIUM AND THE OFFSET PRESSROOM

The paper industry's switch from acid to alkaline paper combined with an increase in the alkalinity of municipally supplied water created a number of problems for offset printers. Many of these issues can be directly traced to the increased presence of calcium in the printing environment. How do calcium deposits affect the printing process, and how can their effects be minimized?

**Rollers** — A uniform white haze can develop on the surface of rollers in the inking and/or dampening trains, interfering with their ability to carry uniform ink and/or water films. This leads to poor ink transfer, roller stripping and sensitive water rollers. In extreme cases, a hard band of white calcium compounds builds up at roller ends, and roller settings cannot be properly maintained.

**Plates** — Calcium compounds that deposit in the grain may lead to plate sensitivity (toning) that cannot be eliminated by increased water metering speeds or the use of alkaline plate washes. Calcium compounds that deposit around or on the dots on the plate can lead to plate blinding, where the image area will not accept ink, or to vanishingly small dots.

**Blankets** — Calcium deposition on the blanket surface (a white haze which cannot easily be removed by plain water) interferes with the ability of the blanket to transfer ink correctly and print a sharp dot with a clean background.

**Water System** — Fountain solution in pans, chillers or recirculating tanks may turn a milky white due to the presence of large amounts of insoluble calcium compounds. Conductivity and pH may both increase dramatically due to the destruction of the buffer system. The pressman may not be able to keep his non-image areas clean despite increased water metering speeds.



## What role can fountain solutions play in reducing calcium-related problems?

The Prisco product lineup includes a wide variety of fountain concentrates for both soft-to-medium and hard water. Water that contains large amounts of hardness and/or alkalinity (generally 200 ppm or more) requires the use of a fountain concentrate with either extra acid (a so-called "hot" etch) or extra buffering, otherwise, the starting pH will be too high. Carbonate alkalinity reacts with the acid in the fountain concentrate, increasing the operating pH.

All modern fountain solutions contain a buffer system which is designed to react

with ( neutralize ) alkaline materials and maintain a constant operating pH. Buffer capacity varies between solutions and sometimes a change has to be made to one that has increased buffer capacity

Prisco fountain concentrates are designed to operate in either the 3.8 to 4.5 or 4.8 to 5.5 ( high pH ) ranges depending on the application and whether or not the printer has calcium related issues. "High pH" solutions have a side benefit of faster drying times with conventional oxidizing type inks because they increase the activity of the drier metals.

## HOW CAN THE PRINTER MINIMIZE CALCIUM PROBLEMS?

Not all alkaline paper and board is bad, and alkalinity in the water supply can be easily dealt with. The essential thing is to recognize the symptoms so that no time is lost in implementing a solution. We can't change the paper or incoming water supply, but by following these recommendations, the printer can minimize the impact of increased calcium on the printing process:

**Water** — The PriscoTech® AquaFlo® II Water Processing System ensures a consistent supply of water designed specifically for the printing process. Other treated water sources have drawbacks – distilled water is very aggressive, and softened water still contains harmful alkalinity.

**Reservoir Maintenance** — Recirculating tanks should be drained on a weekly basis and refilled with fresh fountain solution. At this time, press fountain pans should be cleaned if needed. Printers should monitor and record both pH and conductivity on a daily basis. If pH increases more than 0.5 units, or if conductivity increases more than 1000 µmhos (1000 micro-siemens), versus initial (fresh) readings, consider changing the fountain solution regardless of age. Otherwise, we recommend changing weekly.

**Fountain Solution** — Fountain solutions are selected based in part on water quality, type of press, and dampening system. Type of stock may influence the choice and in some cases, a fount switch to obtain greater buffer capacity may be necessary.

**Press Maintenance** — Conducting regular press roller maintenance is extremely important. Prisco's roller maintenance products — D-Glaze, Salt Crystal Remover, Alkaline Paper Roller Rinse and our newer less corrosive products, Crystal Clear and Crystal Clean Gel — are designed to remove harmful calcium-based compounds from the press' roller train. Metering Roller Cleaner (MRC) and Chrome Roller Cleaner (CRC) are designed to clean and desensitize rollers in the dampening system. Ceramic press rollers may be cleaned with an alkaline cleaner such as Prisco Heavy Duty Cleaner II.

Periodically or as needed, the entire recirculating system should be drained and then flushed with Prisco Royal Flush to remove all contamination.

## SOURCES FOR CALCIUM IN TODAY'S PRINTING ENVIRONMENT

**Water** — All municipally supplied and well water contains at least some calcium. The amount can be determined by a very simple water hardness test. This test, however, does not measure total alkalinity, which is more important when selecting a fountain solution.

Carbonate, which is alkaline, reacts with the acid in the fountain solution, increasing its pH and using up buffer capacity. Conductivity usually, but not always, increases with greater hardness, and alkalinity. These three properties— conductivity, hardness and alkalinity—are independent. A properly conducted water quality analysis always includes all three along with pH.

**Ink** — Press units printing red inks tend to develop more calcium- related problems. Fount in these units may also experience sharp upward increases in pH and conductivity within a short period. Many red pigments in inks are calcium-based, and the constant mixing of fountain solution and ink on the press causes some of this calcium to be “leached out” by, and absorbed into, the fountain solution. Once there, it is free to react with other anions that are present and can form hard insoluble compounds.

**Paper** — Most U.S. paper manufacturing has switched from an acid to an alkaline process. The latter is a less polluting, cheaper process that produces a better printing sheet that is more permanent. But it also introduces calcium carbonate into the printing environment.

Very simply, paper consists of wood fibers, inorganic fillers, and a material called sizing which acts as a glue to hold the insides of the sheet together. Coated paper, of course, has an outer layer, generally starch or latex-based, which also contains fillers.

Acid type paper uses 8-12% clay (an alumino-silicate) as the primary filler along with a rosin-alum sizing. For this to function effectively, a pH of 4.5 to 5.5 is needed which results in a sheet with a residual acidic pH (acid paper). Calcium carbonate can't be used because it would dissolve and cause foaming.

Alkaline paper, on the other hand, is made under slightly alkaline (pH 7.5 to 8.5) conditions, uses an organic sizing, and accommodates higher amounts of filler—usually 15 to 25% calcium carbonate.

Improper or insufficient sizing and/or poor quality coating can lead to piling and the release of calcium carbonate onto the blankets. From there, it can work its way back into the ink and dampening roller trains via the plates (remember, all these items are in continual high-speed contact). Part of the fountain solution's job is to absorb this calcium carbonate. If too much comes out of the paper, the excess ends up on the rollers, plates, and blankets.

Calcium compounds are insoluble in water, alkaline plate cleaners and acid-type fountain solutions. Calcium carbonate reacts with acid to yield calcium ions, which can combine with other ions (citrate and phosphate) and precipitate out on rollers as a white haze or as hard, rock-like deposits.



## MAINTENANCE TIP

White or off-white deposits may accumulate in the bottom of press fountain pans that have poor drainage or exchange rates, reducing their effective volumes and possibly leading to fountain pan overflow.

### OPTIMIZE YOUR PERFORMANCE

We have seen how recent changes in paper manufacturing and municipal water supplies have resulted in calcium-related problems becoming more prevalent in the printing environment. We have also seen that these problems can be easily minimized through regular pressroom maintenance and by choosing the correct Prisco products and PriscoTech equipment.

To help address your specific calcium-related problem-solving needs, we've assembled a Calcium Elimination Kit, which contains six proven Prisco product solutions:

**Salt Crystal Remover** — Dissolves calcium carbonate as well as other salt build-ups and glazes on press rollers. This high strength solution is used to remove heavy calcium build-ups during system maintenance.

**Chrome Roller Cleaner** — Cleans and desensitizes chrome dampening rollers to prevent ink build-up and ensure optimum water film transfer to the printing plate.

**Eezy-Klene** — A creamy-white emulsion that acts as a rubber deglazer, cleaner and conditioner. It contains

plasticizers that help prevent premature hardening of rollers and blankets while providing deep cleaning action during wash-ups and color changes.

**Crystal Clean Gel** — Removes calcium carbonate and other salt build-ups and glazes from press rollers. Apply weekly to keep rollers cleaner, prevent roller stripping and promote more consistent color.

**D-Glaze** — Removes salt and gum glazes, ink, spray powder, paper coating and lint from offset blankets and rubber rollers. D-Glaze also works to revitalize and condition blankets and rollers.

**Royal Flush** — A heavy-duty cleaner for dampening and recirculating systems. Cleans and disinfects dampening systems on all types of printing presses. Recirculate and then flush clean with water.

Ask your Prisco sales or technical representative for more information. With our products and services, we'll help you optimize your performance on press as well as your bottom line.

Your local Prisco office is happy to answer your questions:

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