

WHAT FOUNT SOLUTION?

by Kilian Kleinhenz

ACID sized paper is a product of the past. Modern fine paper for offset printing is neutral sized, allowing the paper manufacturer to implement calcium carbonate as a filler and/or costing pigment. Calcium carbonate has largely contributed to a quality improvement in fine papers, over the past ten to 15 years, in terms of whiteness, ink setting and drying, print evenness, print contrast and permanence towards ageing. The main drawback of calcium carbonate, however, is its reactivity with acids and solubility with decreasing pH.

The results of a comprehensive analysis of a number of fountain solutions and subsequent printing trials carried out with them, gave clear evidence of the fact that an intimate interaction between the fine paper filler and/or coating pigment and the fountain solution exists. Fountain solutions which contain buffer systems that are calcium carbonate-reactive exhibit a tendency to create non-image piling. At its worst, the build-up of precipitate on the blankets can lead to serious caking and plate blinding.

The author demonstrates, with his own formula fountain solution, that paper/fountain solution interaction can be kept to a minimum if a non-reactive buffer system is incorporated into the fountain solution and a higher pH value is maintained. He urges the manufacturers of fountain solutions to conduct deeper studies in fountain chemistry, which will inevitably lead to an improved understanding of paper/fountain interaction and the development of more suitable solutions in the future.

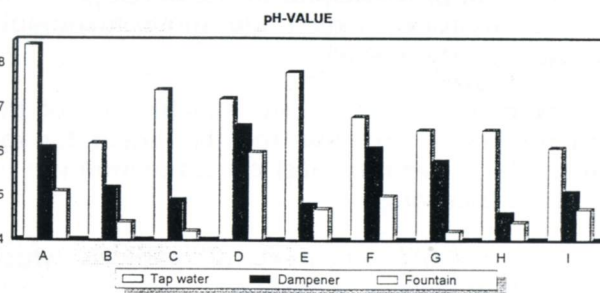
The chemical interaction between fountain solutions and fine paper

During the last decade, the vast majority of fine paper manufacturers in Europe have converted from acidic to alkaline sizing systems called *neutral sizing*. This entails the implementation of reactive, synthetic sizing agents, such as alkyl keten-dimers, which fix themselves directly onto the pulp-fibres at neutral to slightly-alkaline pH values, as opposed to rosin size, which is precipitated onto the fibres with the help of the acidic reacting aluminium sulphate salt; thus justly referred to as *acidic sizing*.

The conversion from acid to neutral sizing opened up totally new possibilities to paper manufacturers. It enables them to use ground calcium carbonate (chalk) as a filler or coating pigment, not previously possible as chalk reacts with aluminium sulphate resulting in the formation of gypsum and carbon dioxide. Calcium carbonate-coated mill broke, when repulped in acidic conditions can also lead to problems. For this reason, the only economical filler or coating pigment previously used was china clay.

Chalk (calcium carbonate) embodies a number of

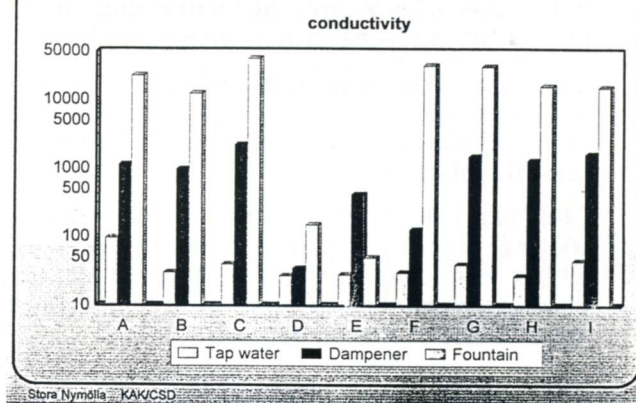
ANALYSIS OF FOUNTAIN SOLUTIONS



ABOVE: Figure 1

BELOW: Figure 2

ANALYSIS OF FOUNTAIN SOLUTIONS



advantages for the paper manufacturer, as well as for the printer: it is whiter, more brilliant, cheaper and more micro-porous than china clay. Calcium carbonate lends the paper positive characteristics such as high opacity at a high brightness level, permanence to ageing and enhanced ink setting and drying properties. Furthermore, it enables paper manufacturers to produce *cleaner* paper, without the fear of high salt concentrations in their water systems and, therefore, has contributed to today's tightly closed water circuits.

The changeover to chalk, however, also brought about a few drawbacks, such as the higher risk for resinous contamination in the paper machine, higher costs for sizing, the water system can become more prone to slime and bacteria attack and finally the tendency for dusting and linting during offset printing can increase.

Papermakers have undertaken enormous efforts, during latter years, in minimising the picking, dusting and linting tendency of neutral sized fine paper. The internal and surface strength properties of modern fine paper has been improved to the equivalent level of old-fashioned china clay filled (or coated) paper. Despite this, fine paper manufacturers have, in recent times, registered a steady increase of inexplicable 'dusting' claims, especially in the Nordic market sectors. The common denominator of these curious claims is always the build-up of a more or less even white film in the non-image areas of the