

Fountain solutions for lithography

J W Birkenshaw, Pira

Introduction

The role of water in the lithographic process has been studied extensively, but it must also be said, without too many firm conclusions being reached. In fact, many papers or articles have been published but they almost entirely contradict each other and therefore offer no useful guidance. A further complicating factor is that as press design has progressed, then the requirements for a fountain solution may also have changed.

For example, previous studies have suggested that on a conventional press, high surface tension of the fountain solution is required on the plate but that a lower value is advantageous in the dampening system. As a result a compromise is used. But with modern high speed presses and new dampening systems, the surface tension requirement may be quite different or not important.

Another view has developed from those who have studied the basic water characteristics. It is evident that local water supplies vary greatly, from one area to another but even in relatively short periods of time at a single point of delivery. In this situation is it realistic to expect fountain solution additives to work at an optimum? Or, is there a possibility of significant saving through reducing the amount of additive in those districts where the water supply is suitable?

Finally we might observe that the fountain solution is often blamed for all sorts of problems that occur on press. Certainly there is the possibility that dissolved salts in the source water may interact with constituents of the paper and ink. This could lead to problems such as ink piling, ink drying, ink transfer difficulties and lower print quality, but we suspect that often the fountain solution is being used as a convenient scape-goat since it appears to be impossible to conclusively demonstrate any cause and effect relationships.

What is in a fountain solution?

An astonishingly wide range of substances are used in fountain solutions, as indicated in the following list.

Additive

Attribute

Acid

Used to reinforce the desensitising agent and bond the gum to the plate. Also said to form salts with aluminium that are more hydrophilic, so keeping the plate cleaner. Causes corrosion to cylinders and plates. May attack image areas. Reacts with some pigments and vehicles. May react with some paper coating causing discoloration or problems with adhesives.

Alcohol

Reduces emulsification and fibre displacement. Has a refrigeration effect. Ink/water balance normally achieved more quickly. Brighter colours, sharper halftones. Less residual water left on blankets and paper. Anti-foaming agent. Can cause inks to pick, and precipitates with gum to cause piling.