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CASE STUDY

A New Press with New Challenges

Is viscosity control important?
Is the adjuster fluid really important or is using water good enough?

Most printers don't know the answers to these questions and Smurfit Kappa(Swisswell AG) in Möhlin, Switzerland was a textbook case in point.

Challenges Faced

- A significan gradual loss of colour density on print runs.
- Customer dissatisfaction with inconsistent quality.
- Atypical substrate waste and high ink consumption.
- Constant operator attention necessary with frequent press stoppages for colorimetric checks.
- Print runs a lot longer than normal to complete.
- Overly strong and irritating ammonia odour surrounding the press.

Results achieved

- Colour density stabilized on many different corrugated substrates -coated or not.
- Customer satisfaction.
- Marked cost reductions (substrate, ink usage, and transportation charges).
- Appreciably shorter press run times.
- Significantly reduced usage of fluid adjuster.
- Noticeable reduction in ammonia odour around the press area and in the plant.

Swisswell is part of the Smurfit Kappa Group. The Group's operations span 23 European and 9 Latin American countries. The company's 43,000 employees are dedicated to generating value for customers by offering high standards of service, quality and innovation. They deliver corrugated packaging to suit individual product profiles with innovative and tailor-made packaging solutions

Their slogan is: **Pack it in colours!**

The Whole Story

With the arrival of their new state of the art Masterflex press, Swisswell continued to experience an old problem but even more acutely. During the print run, the colour density would decrease over time, relative to the type of corrugated substrate used. With a non-coated more absorptive substrate, the change was evident only after several hours into a print run, however when printing on gloss white-top coated board, the loss in colour density became apparent very quickly 15- 20 minutes on average.. It was an exasperating problem and each of their partners and suppliers weree being solicited for help. They didn't know where to look...Was it:

- The ink formulation,
- A press defect,
- The viscosity control method,
- A substrate characteristic, or
- The operators?

The Solution

A innovative color management system that would provide the following results

- A maintenance free, in-line viscosity sensor without any moving parts.
- Precise and repeatable viscosity measurements
- An on-demand fluid delivery system for frequent and minute adjuster fluid additions.
- A user-friendly touch screen interface.

The Color Management solution solved all of their problems and even more!

While the installation of the Color Management system minimized the ink viscosity variations, the colour density loss was attenuated but not eradicated. This improvement was achieved by eliminating the errors inherent with manual viscosity measurements and makeshift adjuster fluid additions. The Color Management system made frequent corrections to maintain the viscosity and actually extended the length of time a job could be run without problems but the color density always came back to rear its ugly head even though the ink viscosity was stable, only varying within a span of 5-6 CPS (about a half second on a Zahn# 2) during the print runs.

During our consultation the ink supplier recognised an opportunity to improve the print process by using a different type of adjuster fluid --->

A Case Study: A New Press with New Challenges

The Color Management system continuously and precisely measures the dynamic ink viscosity in the ink supply circuit. The precision of control is essential but just as important is the "in-line" measurement in proximity to the ink metering system. The adjuster fluid injection system is extremely precise, making calculated adjustments relative to the difference between the actual viscosity measurement and the desired set point. I have gained a wealth of knowledge and technical expertise during my last twenty-five years in the printing industry and especially in the comprehension of ink management technology as it pertains to day-to-day issues on the printing press. Following up on some other successes, I proposed changes to their composition and pH of the adjuster fluid to make the printing process much more efficient and economical and trouble-free

The keys to our solution:

- The pH scale is a logarithmic scale with a neutral point of 7.0. A tenfold increase in the amount of the alkaline or acidic compound of a solution will raise or lower the pH value by 1.0, respectively.
- A change in the ink viscosity or pH value of a water-based ink will cause an inversely related change to the other's value.
- An ammonia solution is extremely volatile, hazardous and flashes off very rapidly at higher pH levels.
- Selecting an adjuster fluid pH value too close to the ink's pH control value will effectively dilute the ink chemistry while correcting the ink viscosity.
- Contrary to an ammonia solutionan amine salt solution is much more stable and flashes off more slowlyu at higher pH levels .

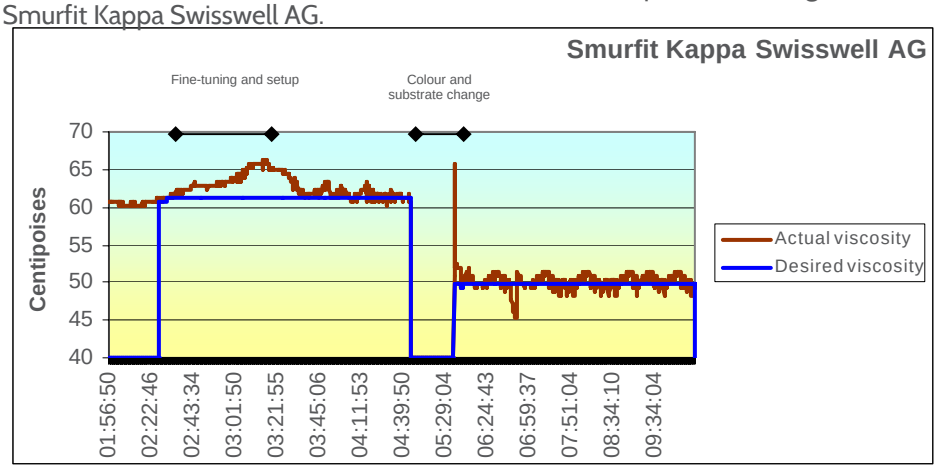
There were several reasons why they chose the particular adjuster fluid for the test, Local experience; but cost and transportation regulations were important contributors. That is why the ammonia-based solution of a pH of 9.5 was selected; A pH any higher would make that solution a regulated hazardous material. Higher transportation costs as well as worker safety, safe handling and storage were also definite concerns.

Even though the QC checks on the substrate, the ink, the press and the Color Management system were all found to be well within the control parameters, this new adjuster fluid did not really improve the situation or resolve the root cause.

The product I proposed was a change in the chemical type of the adjuster fluid with a much higher pH while not having the hazardous product rating. Transportation regulations, safe handling and personal safety were normal This change to an amine based adjuster fluid with a slower evaporation rate would result in a significant reduction in the amount of adjuster fluid required to maintain the ink viscosity. The higher pH would mean less chemical for corrections while lowering the loss by evaporation of the adjuster fluid.

A day long test was proposed that encompassed the most difficult conditions with the with uncoated and coated whitebpord. The results achieved success to a degree that after three hours, continued testing would not be necessary. The colour density stabilized, the strong ammonia odor disappeared, and the jobs were ran at optimum press speeds . During the test run they also noticed that they did not need to stop to clean the printing plates as often, The very requent QC colour checks were no longer necessary.

The Ink Management system set the base conditions for the changes to be implemented. With manual or any mechanical viscosity control, using an amine adjuster fluid with a very high pH would cause other ink stability problems. Over-dosing causing kick-out of the primary ingredients being one of the most serious results. Control of the ink viscosity to a half second (3-5 Centipoises) of the desired set value is actually possible. The following chart shows the actual results from one of the four ink stations in operation during the test at Smurfit Kappa Swisswell AG.



This precision or fingerprint is by far one of the most important benefits of Color Management system and is possible with any of the commonly used substrates, with solvent, water-based or EB inks, on any well maintained press including newer sophisticated high speed printing presses.