

RHEOLOGY SOLUTIONS

INVESTIGATION OF PRINTING INKS

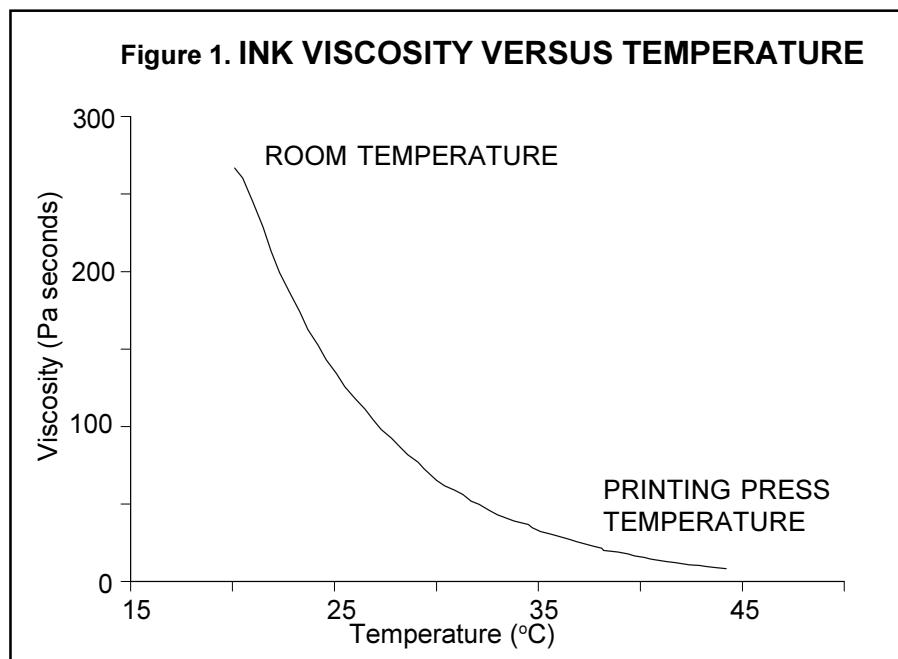
PROBLEM

Two of the main characteristics of interest to users of printing inks are flowability (viscosity) at the temperature of printing and rate of “structure recovery” during press stoppages. A quick procedure for evaluating and comparing those properties for different formulations is desirable.

SOLUTION

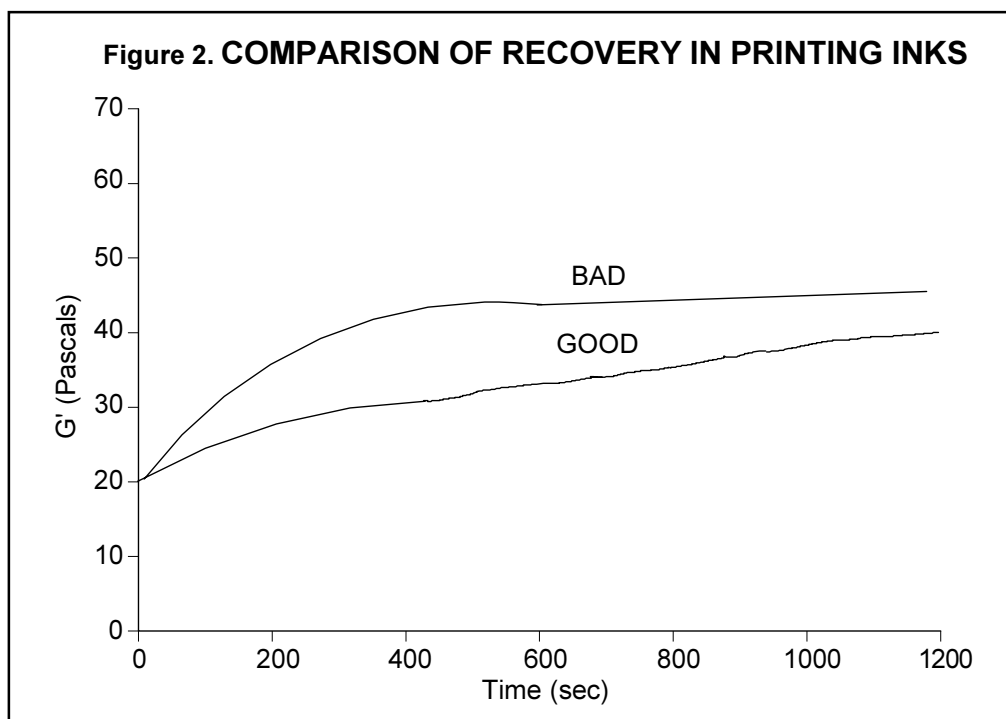
A controlled stress rheometer provides a convenient technique for evaluating printing inks. Figure 1 shows typical viscosity versus temperature results obtained from flow measurements with such a rheometer. In this case, a Peltier

heating plate was used to rapidly raise the ink’s temperature during evaluation. The temperature was ramped from about 20°C (room temperature) to 45°C (press temperature) in 1 minute which approximated the temperature change the ink was exposed to during normal printing operations. From this curve, it was easy to determine if the ink had achieved a suitable viscosity by the time it came to press temperature. Figure 2 shows the results of oscillatory tests performed on the same rheometer which were used to predict time dependent structure recovery in inks determined to be “good” and “bad” during a printing press shutdown and restart. When a printing press stops in the middle of a printing run, ink is present within the press mechanisms. During the stoppage, the ink’s internal structure which was broken down (sheared)



by the printing process begins to rebuild. If the press is shut down too long or the structure rebuilding within the ink is too rapid, problems arise on press restart because the ink is too viscous and resists the pumping pressure dispersing it on the press. The curves shown in Figure 2 are G' (elastic structure)

versus time plots. As expected, the increase in G' indicating structure rebuilding was more rapid in the “bad” ink. Furthermore, curves like those in Figure 2 provide an indication of the “shutdown” time available with a particular ink formulation before problems occur.



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