

PTN4 INKJET PAPER TESTING

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SUMMARY

A suggestion is made that plain paper inkjet print quality which can be attributed to feathering (ink flow along fibers) is amenable to process control without the use of expensive printers from each manufacturer. By using the ***penetrating surface tension*** (PST) test method we can control feathering. The test method is quite simple. Small drops of methanol-water mixtures with surface tensions from 35 dynes/cm. to 72 are carefully placed on the paper surface. With backlighting we observe at what surface tension (and lower) instantaneous penetration takes place. This is called the ***penetrating surface tension*** (PST) value. The optimum PST to maintain minimum feathering with a particular ink and printer can be monitored as paper is made and internal sizing additions can be adjusted as needed. The test can also be used to minimize the use of internal size to only the amount needed.

INTRODUCTION

With the current emphasis on inkjet printing, it is worthwhile to explore test methods which allow us to adjust wet end furnishes and surface sizing furnishes to meet printing requirements on plain paper. Customers have apparently indicated a preference for 'plain' paper in office applications (1). On the other hand we have information on water based ink-paper interactions that show paper characteristics are an important aspect of print quality (1,2).

PRINT QUALITY REQUIREMENTS

Print quality requirements and the effect of water based inks have been reviewed in a recent publication (1). The image quality attributes included sharpness, contrast, solids noise and tone reproduction. In the oral presentation the author stated that about 80% of the quality requirements of these factors related to the amount of feathering. The emphasis of this article will be to discuss a practical way of measuring feathering.

PENETRATING SURFACE TENSION

Unlike other sizing test methods which use a single liquid (such as KBB, Hercules and Cobb), methods measuring ***penetrating surface tension*** (PST) use liquids of differing surface tensions, usually mixtures of an alcohol and water. One method uses the Bristow wheel and isopropanol-water mixtures (2). A more rapid procedure used ethanol-water mixtures (3). This was modified by using methanol in place of ethanol (4). The technique is relatively simple. Small drops of aqueous methanol mixtures with surface tensions of 35 to 70 are gently placed on a test sheet and penetration is compared. The highest surface tension mixture that penetrates instantly (as seen by using backlighting) is called ***penetrating surface tension***. Table 1 lists compositions of mixtures needed to obtain surface tensions in increments of 5 dynes/cm. Smaller increments can be used for greater precision, but more time would be needed to complete each test sequence.

Table 1. SURFACE TENSION OF METHANOL-WATER MIXTURES

Surface tension Dynes/cm	% Methanol (volume)
35	49%
40	36
45	26.5
50	19
55	13.5
60	7.5
65	3.5
70	0.5

average of surface tensions at 20 and 30 deg. C., nominally about +/- 1 dyne/cm.(5).

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