

www.npatest.com

The Paper & Ink Stability Test

This test measures the ability of the paper to absorb the thin oils from ink, by measuring the change over time in printing tack of the ink on the paper. The standard ink used for this test is quick set sheet fed process cyan ink, containing about 21% volatile (Hydrocarbon) oils. Once printed, as the oils leave the ink film (being absorbed by the paper/substrate), the ink sets, its tack increases and after time, eventually dries.

During this test, the sample is taped to the load cell on the bed of the press (see Figure A). The load cell measures the splitting forces between the ink and the blanket and the substrate being tested. Measuring the resistance of the paper to stick to the inked blanket as the blanket passes over the sample does this. On the initial pass, the ink film splits approximately 50:50 between the blanket and the paper. These splitting force readings are taken every 7 seconds.

The data is gathered over time, generating a setting curve (Figure B), and the SLOPE of this curve is

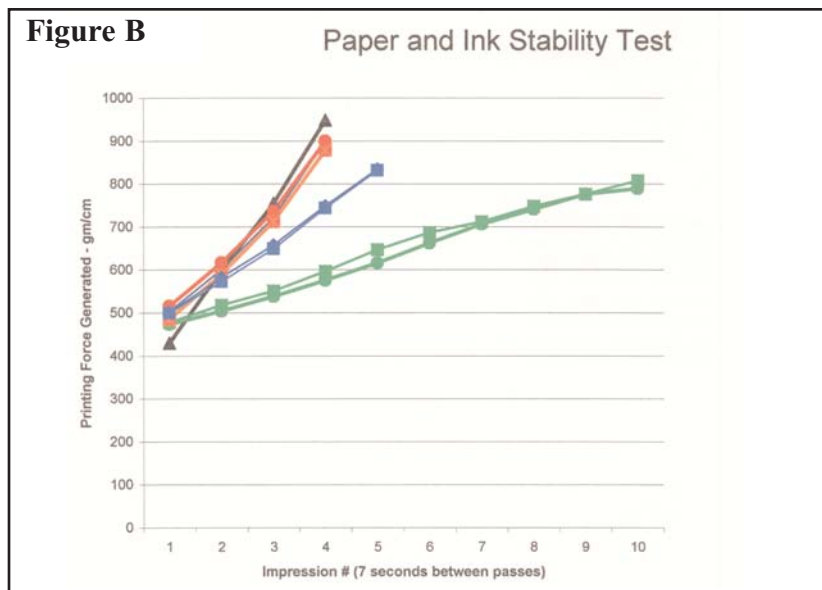


Figure A - Printed ink film splitting between the blanket and the impression block. Paper is attached to the load cell at the left (arrow)

reported as the rate at which the ink and paper combination “set”; the higher this number, the faster the setting rate, and the lower the number, the slower the set rate.

Figure C shows the ideal values we recommend based on many years of experience in calibrating these results to performance on press for different paper and board grades.

SLOPE: If the slope value falls below the minimum recommendation, offsetting in sheet-fed, poor transfer and fountain solution interference on press are likely. High slope values can lead to picking on press, and if the paper is non-uniform, to fast setting and BackTrap Mottle problems.



interference on press are likely. High slope values can lead to picking on press, and if the paper is non-uniform, to fast setting and BackTrap Mottle problems.

PASS to FAIL: We also report the numbers of passes to fail. 4 passes is the minimum acceptable value. Below that and picking is likely.

FORCE @ FAILURE: This is the maximum force the paper can tolerate before failure occurs (picking on our blanket). The printing process and the tack value of the inks that are likely to be used govern the requirement here.

FIGURE C: Recommended Test Values for the P&I Test:

Data	#1 grades	#2 Grades	#3 Grades	#4 Web	#5 Web	SC
Slope gm/cm/sec	3.0 -10.0	3.0 -10.0	3.0 -10.0	3.0 -10.0	3.0 -10.0	1.0-10.0
# Passes	4-10	4-10	4-10	4-10	4-10	3-10
Force At Failure	700-900	700-900	700-900	600-800	600-800	300-500

A note about ink:

If ink contains heavy oxidation-type oils, it sets slowly and eventually dries by exposure to oxygen (oxidation). These inks are used on non-absorbent substrates, like uncoated papers, plastics, and other films. If the ink is formulated with hydrocarbon oils, it is classified as a “quick set” and can only set and dry by absorption into the stock. All web offset inks are formulated with HC oils.

Remember, performance on press is dependent on this test together with the results of the **Mottle** and **Water Sensitivity** tests.