

Performance Enhancement in Digital Printing Media

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Abstract

This paper reports recent development of paper grades with enhanced print quality and runnability for today’s digital printing markets. The performance requirements of the digital printing paper grades are discussed. Understanding of the paper/ink and paper/toner interactions is critical to achieve superior print quality. Gloss coated paper grades were developed to provide high print gloss, high brightness, superior print quality and excellent runnability for a wide range of digital imaging equipments.

Introduction

Digital printing technologies have found increasing applications. Paper is an integral part of the equation with the ongoing advances in print technology. The demand and performance of digital printing paper grades are increasing as the technologies find new application everyday. Most cases new print engines are viewed as technological advancement, however paper is often considered as simple commodity with less sophistication but the reality is quite contrary. Although there are new printers/copiers introduced in the market that are more media friendly yet the media requirements for today’s digital printing is still stringent and demanding. Especially now all the manufacturers are driving for speed and superior print quality, media should be taken into account in order to deliver the promised print quality to the customer. The two critical function of Paper in any imaging system are (1) print reliably without downtime (paper jams, contamination etc.) (2) produce the highest possible print quality for the enhanced communication. Therefore the paper surface characteristics must be optimized to achieve these goals.

Gloss Coated Paper for Digital Imaging

To meet the increasing demand of premium quality coated paper, we have developed a superior coated paper with enhanced imaging and runnability that can be used in high speed color and black and white copiers, laser printers as well as offset and digital offset presses. The gloss-coated sheet has a smooth, glossy finish with excellent toner adhesion properties. It is ideally suited for commercial printers, quick printers and in-plant printers. Applications of gloss coated digital printing paper include photo enlargements, color presentations, color inserts for publications, sales sheets, and design proofs.



Figure1. Schematic of C2S gloss coated paper

Figure 1 gives a schematic illustration of a coated C2S gloss sheet. The selection of coating substrate is very important since the properties of the substrate can affect the performance of the coated substrate. Base papers with high smoothness and high brightness are preferred to use as coating substrate. Binder resins are selected to provide a resultant coating with high gloss, high brightness, high blister resistance, improved toner adhesion and superior image quality.

The print quality of Photo EP paper will be approaching photographic quality. It is estimated that the prices of color laser printer will be approaching \$500 or less so that color laser printing will enter home and EP photo paper will be sold at retail. The new paper grade is a 120 gsm gloss-coated, 90 GE brightness with a gloss level of 70 % at 75-degree gloss. Extensive performance evaluation on high-speed copiers and printers confirmed the excellent runnability and print quality of these coated grades.

Table 1. Typical properties of the new gloss coated EP paper.

Basis Weight	120 gsm
Gloss	70
ISO Brightness	91
Opacity	94
Cut Size	8.5x11 inch; 11x17 inch
	12x18 inch

Runnability Test Results

Some known disadvantages of existing coated paper grades include poor runnability on copiers/printers and blistering. Therefore the customers tend to stay away from coated sheets to avoid down time. To meet the market demand, we have developed a coated sheet with excellent runnability in a wide range of digital imaging equipment tested. This paper is specifically engineered to provide jam free performance on both high-speed black and white copiers and color copiers/printers. Figure 2 provides the jam rate per thousand in color copiers when compared with commercially available coated sheets to the newly developed gloss-coated sheet. A patent-

pending coating formulation with high porosity and blister resistance was used in order to eliminate the problem of coating blistering, Figure 3 shows the test results on coating blisters in color copiers.

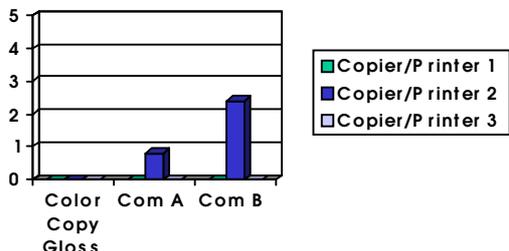


Figure 2. Comparison of jam rate (per 1,000) of the Hammermill Color Copy Gloss with other commercial coated paper products.

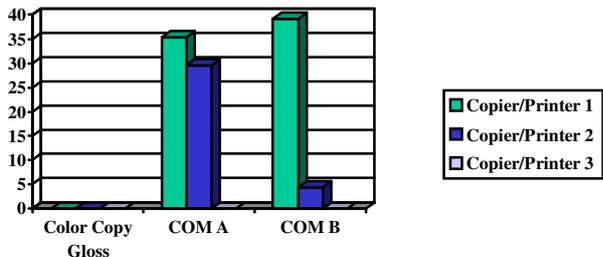


Figure 3. Blister test results (number of blisters per 1,000 sheets) of Hammermill Color Copy Gloss paper with other commercial coated paper products in color copiers.

Conclusion

As described above, we have developed gloss-coated paper grades that provide

- high print gloss
- high brightness
- superior print quality
- excellent runnability

Based on the test results, these gloss-coated grades could be used in a wide range of digital imaging equipments currently available in the market

References

1. Hammermill Color Copy Gloss Training Manuel, International Paper Company, 2002.

Biographies

Jay Song is a Senior Research Scientist in the Surface Science group of International Paper’s Corporate Research Center at Tuxedo, New York. His main research interests are in improving paper media for better runnability and print quality on different digital platforms. He holds a PhD in Polymer Chemistry and MBA in General Business.

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Ned Spangler is Brand Manager of Merchant Imaging Papers for International Paper. He received his BS in Industrial Engineering & Operations Research from Virginia Polytechnic Institute and State University and a MBA from the University of Virginia. He has worked at International Paper for twenty years in various sales, marketing, and management positions.