RESEARCHERID
THOMSON REUTERS

[Gupta* *et al.*, 6(6): June, 2017]
IC™ Value: 3.00

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

IJESRT

INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

PRINTABILITY COMPARISON OF WHITE OPAQUE AND GOLDEN OPAQUE NTR (NON TEARABLE) PAPER WITH DIGITAL PRINTING

Mrs. Chetna Gupta[*1], Mr. Ankit Boora[2], Mr. Sandeep Boora[3] & Mr. Bijender[4]
[*1,2,3&4]Department of Printing Tech., Guru Jambheshwar Universiy of Science & Technology, Hisar

DOI: 10.5281/zenodo.814516

ABSTRACT

For achieving better quality targets, conventional paper is being replaced by NTR paper (Synthetic paper).Synthetic paper is available in various finishes, golden opaque & white opaque are most popular in that.Objective of this paper is to analysis printability of golden & white NTR paper grade.A master was prepared with the help of high definition images, various quality control patches & some text which was printed with the help of dry toner based digital printing machine.The test prints were analyzed for printability Gain, Print Contrast.

KEYWORDS: Ntr Paper, Digital Printing, Solid Ink Density, Print Contrast, Dot Gain, Synthetic Paper.

I. INTRODUCTION

Paper plays an important role in our life in many ways.Communication and information are two main aspects which are possible with paper.There are many reasons for us to know about the properties of paper either in positive or negative way.Paper is defined as "A thin sheet made up of different cellulosic material like wood,pulp or other fibrous substances.It can range from thin sheet to heavier stocks.The paper can be water resistant, tear resistant, transparent, soft, opaque etc. Properties of paper include the thickness, weight, texture, folding endurance, strength and size of the paper. Some grades of paper tear easily, while others resist tearing. The *moisture retentioncapacity* is another important property of paper. Some grades of paper dry very quickly and do not absorb *moisture*.

Synthetic paper is a type of calendared plastic sheet which is a unique mixture of Calcium-carbonate i.e. clay and polypropylene resin. This duo combination results in fabrication of paper with not only printing facility but also durability and tear resistance of plastic. In case of white opaque paper which is fine mat finish single-layered substrate has excellent bonding strength and facilitates superior ink adhesion characteristics. It is easily printable without any surface treatment.Another example in this category is Hop-Syn G2 synthetic paper.
This paper is especially designed for printing of high quality and heavy gauge polypropylene. This offers excellent features required for packaging sector.

According to early development, the primary material using for synthetic paper is synthetic resin which is derived from petroleum. This is the material which gives it characteristics similar to those of plastic film. However the appearance of this is remarkably similar to regular paper which has been made from wood pulp. In market many of the suppliers are available who provide this paper. There are many types of synthetic papers which are available in the market globally or in domestic market. Quality or characteristics of synthetic paper is depends on the materials has been used. During manufacturing of synthetic paper, we have to keep in the mind that what type of quality we need as per requirement and what type of inks we are using for that paper. For example if the printer are not using special inks then it may clay coated paper, but if printer is using special inks then we have to manufacture non porous paper with directional grain.

Plastic sheets and can resist high temperature, due to this it is not required more additional time for ink drying mechanism. The main concern during manufacturing of synthetic paper is type of product for which it has been manufactured and type of ink which it has been used on the paper.

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

There are so many products which has been made using synthetic paper but the tag and label industry is the largest growth area for the synthetic market. These include outdoor applications, posters, store banners, POP display materials, covers, medical cards, rough duty maps and manuals. Synthetic paper are superior to pulp paper but they are most costly as compare to other papers.So according to market trends, synthetic papers are used whenever paper cannot fulfill an application. It has basically become a problem solver. The main challenge with synthetic paper is drying issue. The compatibility of any printing process with synthetic paper is not so easy. The most common process used for synthetic paper is digital printing.As in this method,drying mechanism is much faster as compare to other process.

Some synthetic paper is made from silica particles and these are more porous in nature than

II. RESEARCH OBJECTIVES

Synthetic paper is quite new aspect for research and a lot of work can be performed to check its printability with different quality control parameters. Synthetic paper is quite different from cellulose paper and it is estimated that its properties may also vary from conventional paper.

The main research objective is to analyze critically dry toner based digital printability of golden and white opaque NTR (Non-tear able) synthetic paper. Therefore in order to study aforesaid research objective the complete task was carried out by considering the following aspects so that research objective could be made efficiently. The objective of this research case is:-

- To analyze critically dry toner based digital printability of golden and white opaque NTR (Non-tearable) synthetic paper.

III. RESEARCH METHODOLOGY

The above research work was carried out in the Quality Control laboratory of "Galaxy offset India Pvt. Ltd" Manesar, Gurgaon-122001 . A master was developed with text, picture, and other quality control patches to take care of print quality factors and their measurement. The test prints were taken on Digital Printing Machine (Xerox 2100 Versant). White opaque and golden opaque NTR paper has been used for the printing with digital printing machine. The printability characteristics of the both paper was studied with the related measuring devices in the quality control department Galaxy offset India Pvt Ltd. After printing the printed sample were analyzed with Spectrodensitometer.

IV. DATA COLLECTION & ANALYSIS

Table.1. Solid Ink Density on Golden opaque and White opaque NTR paper in digital printing

SOLID INK DENSITY (AVERAGE VALUE)		
COLOR	GOLDEN OPAQUE	WHITE OPAQUE
CYAN	1.48	1.94
MAGENTA	1.43	1.83
YELLOW	1.16	1.16
BLACK	1.7	2.26

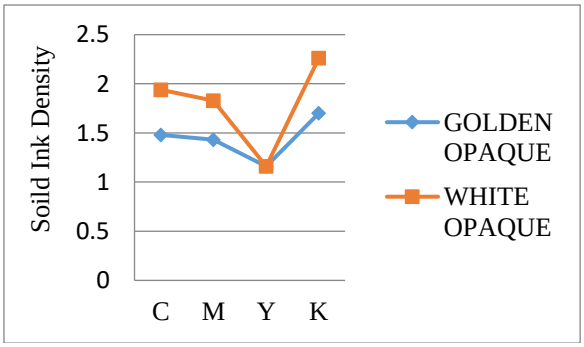

Figure.1. Solid Ink Density on Golden opaque and White opaque NTR paper in digital printing

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

Table.2. Dot gain on Golden opaque and White opaque NTR paper in digital printing

DOT GAIN AT 50% (AVERAGE VALUE)		
COLOR	GOLDEN OPAQUE	WHITE OPAQUE
CYAN	32.5	22.43
MAGENTA	30.36	20.53
YELLOW	26.33	16.93
BLACK	38.56	25.43

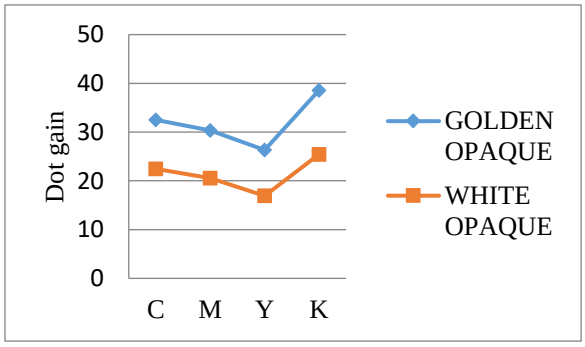

Figure.2. Dot Gain on Golden opaque and White opaque NTR paper in digital printing

Table.3. Print Contrast on Golden opaque and White opaque NTR paper in digital printing

PRINT CONTRAST (AVERAGE VALUE)		
COLOR	GOLDEN OPAQUE	WHITE OPAQUE
CYAN	36.54	52.82
MAGENTA	31.83	49.02
YELLOW	19.68	38.7
BLACK	42.92	54.78

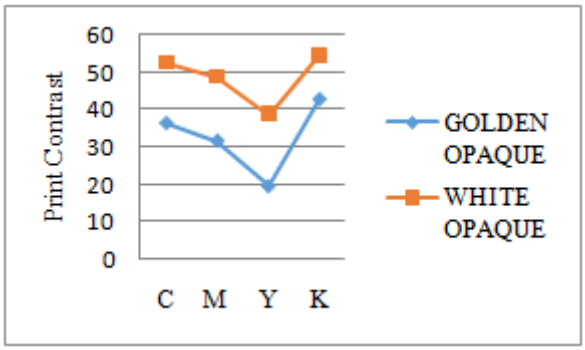

Figure.3. Print contrast on Golden opaque and White opaque NTR paper in digital printing

V. RESULT & DISCUSSION

After analysis of data collected from the different tests, the following results are found:

1. **Comparison of solid ink density with digital printing:** It is found that Solid Ink Density range on golden opaque NTR paper is 1.47 to 1.49, 1.42 to 1.44, 1.14 to 1.18 and 1.66 to 1.77 of Cyan, Magenta, Yellow, and Black respectively. On the other hand, Solid Ink Density range on white opaque NTR paper is 1.94 to 1.96, 1.82 to 1.85, 1.16 to 1.18 and 2.25 to 2.29 of Cyan, Magenta, Yellow and Black respectively. Solid Ink Density was found higher in case of white NTR as compare to golden NTR. It

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

signifies that ink hold out of white NTR is more than golden NTR. It results that more number of pours are existing in the golden NTR paper. Ink absorbs deeper in case of golden NTR paper.

2. **Comparison of dot gain (at 50%) with digital printing :** It is found that dot gain percentage range on golden opaque NTR paper is 31 to 33%, 30 to 31%, 25 to27%, and 37 to 39% of Cyan, Magenta, Yellow, and Black respectively. On the other hand, dot gain percentage range on white opaque NTR paper is 22 to 23%, 20 to 21%, 16 to 18% and 24 to 26% of Cyan, Magenta, Yellow and Black respectively. Dot gain was resulted more in case of golden NTR which might be due to more porous nature of golden NTR as compare to White NTR. That's why ink may spread more in golden NTR paper.
3. **Comparison of print contrast with digital printing:** It is found that print contrast range on golden opaque NTR paper is 35.13 to 37.58, 30.76 to 32.86, 18.96 to 21.36, and 41.76 to 45.29 of Cyan, Magenta, Yellow, and Black respectively. On the other hand, print contrast range on white opaque NTR paper is 51.54 to 52.82, 47.80 to 50.00, 36.75 to 40.67 and 53.77 to 55.11 of Cyan, Magenta, Yellow and Black respectively.

VI. CONCLUSION

After Analysis of collected data, we have following findings as listed below:

- White opaque NTR paper is superior to golden NTR in case of solid ink density evalution,reason may be presence of more numbers of pours in golden opaque NTR paper.
- On 50% areas, dot gain was found more of golden NTR paper.
- Print contrast was more in white opaque NTR paper..

VII. REFERENCES

[1] M Takashi, M Yoshiyasu, "review of research at Synthetic Papers And Method Of Making"
[2] Stephen O Cook, "review of research atMethod Of Manufacturing Synthetic Paper Laminates"
[3] Daniel J. Harrison, Jong S. Lee, "Process For Making Extruded Receiver And Carrier Layer For Receiving Element For Use In Thermal Dye Transfer .
[4] A.J. Brona, J.M. Tiffanya, S.M. Gouveiaa, N. Yokoib, L.W. Voona, "functional aspects of the tear film"
[5] Jesús A.G. Ochoa de Alda,"feasibility of recycling pulp and paper mill sludge in the paper and board industries"
[6] J.H. Han, J.M. Krochta, "physical properties and oil absorption of protein coated paper"
[7] OswaldoJ.DanellaJr.,RuthCampomanesSantana,SílvioManrich,SatiManrich, "surface and printing properties of synthetic film papers"
[8] Stephen 0. Cook, Mill Valley, Calif, "method of manufacturing synthetic paper laminates"
[9] Takashi Toyoda, Akira Akimoto, Masaaki Yamanaka, YonetarouKobayasi,"synthetic paper printable in high gloss"
[10] Masanori Takashi, " method of making synthetic paper"
[11] Gary L. Driscoll, "process for making synthetic paper pulp"
[12] K Aoki, T Kamaishi, "Method for producing synthetic paper"
[13] Akihiko Ohno, "synthetic paper with multilayer structure and excellent printing property"
[14] Katsukuni Nitta, "Composite synthetic paper"
[15] http://www.bccresearch.com/market-research/plastics/synthetic-paper-technologies-global-markets-pls023c.html
[16] http://www.sciencedirect.com/science/article/pii/S0141022904001218
[17] http://www.sciencedirect.com/science/article/pii/S0926669003001171
[18] http://www.inplantgraphics.com/article/synthetic-paper-is-it-you-13841

CITE AN ARTICLE

Gupta, C., Mrs, Boora, A., Mr, Boora, S., Mr, & Bijender, Mr. (2017). A SURVEY OF ECO-FRIENDLY TECHNIQUES COMING FORTH IN SHEET-FED OFFSET PRESSES. *INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY, 6*(6), 393-396. doi:10.5281/zenodo.814516