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STUDY OF PRINT CONTRAST IN DIFFERENT DOT SHAPES (LINE AND ROUND) OF HALFTONE ON PRINT QUALITY BASED ON DRY TONER ELECTROPHOTOGRAPHY DIGITAL PRESS

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ABSTRACT

Electrophotography is a NIP (Non-Impact Printing) process. This printing process is most commonly used printing process in now a day. The electrophotography printing is based on the halftones. These halftones are available in different dots shapes like Diamond, Elliptical, Square, Line, Round etc. In this research paper, we compare the print quality bases onprint contrastof different dot shapes like Line and Round. The sheets were printed with different halftone dots shapes like Line and Round with the help of dry electrophotography printing process.

Keywords: *Electrophotography, Non-Impact, Halftone Dot,Halftone Dot Shapes, Print contrast, Diamond, Elliptical, Square, Line, Round.*

I. INTRODUCTION

The xerography or Electrophotography introduced by Chester Carlson in 1938 in New York City. The electrophotography printing process is done in five steps that start from(1) charging a photo receptor belt or drumwith a coroton or scorotron.; (2) exposure with lighta laser beam is used; (3) development the latent image is converted in the real image with the help of the series of black and colored toner cartridge; (4) Transfer the toner on substrateCorotrons rollers are used to transfer the toner on the photoreceptorto the paper electrostatically using the opposite charge of toner;(5) fusing the image on substrate and last step is (6) cleaning of the photoreceptor drum or belt. Halftone is the reprographic system that recreates continuous tone imagery using the dots, differing either in size or in dispersing, in this manner producing an inclination like impact. "Halftone" can likewise be used to refer explicitly to the picture that is created by this procedure. This propagation depends on an essential optical illusion: the small halftone dots are mixed into smooth tones by the human eye.

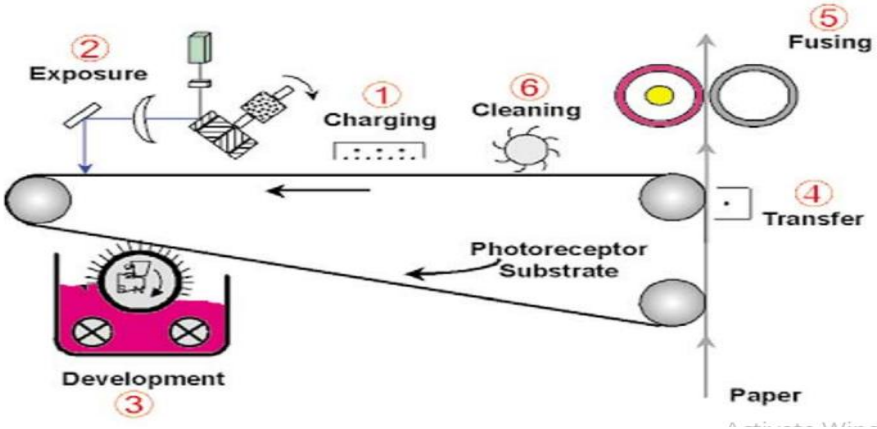

Fig. 1 Schematic diagram of the monochrome xerographic process.

A photoreceptor belt is uniformly charged in step (1). An image is written on this belt by a laser in step (2), thereby generating a charge image on the belt. This charge image is converted into a powder image of toner on the belt in the

development step (3). This powder image is transferred to a sheet of paper in the transfer step (4) and subsequently fused to the paper in step (5). Residual toner on the photoreceptor is cleaned off in step (6) and the process repeats.

Print Contrast: - A strategy for assessing and upgrading the thickness of the ink kept on the substrate and printing. It is determined by estimating the ink thickness of a strong territory and the ink thickness in a tint.

Dt-DS/DS
Where DS is solid area density and Dt is the tint density.

II. RESEARCH OBJECTIVE

To study & analyze the effect of different halftone dots (line and round) on print quality factor of Print Contrast in multi-color Dry Electrophotography digital press.

III. RESEARCH METHODOLOGY

The master chart is with the help of suitable tools and images according to the requirement of theresearch. The sheet was printed with dry toner electrophotography with different dot shapes (line and round).The sheet is printed in the **"Xerox® Versant® 80 Press"** Dry Toner Electrophotography with suitable conditions and used coated paper.

3.1 Specification of Xerox® Versant® 80 Press: -

Speed	Up to 80ppm
Media Weight	52gsm to 350gsm
Media Sizes	Up to 13" * 19.2"
Duty Cycle	460000
Dimensions	860mm(W) * 831mm(D) * 121mm(H)
Weight	295kg
Copy with single-pass duplex scanning	200 images per minutes
Media Types	Coated, Uncoated, Tabs, Envelops etc.

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Fig. Master Chart

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IV. DATA COLLECTION AND ANALYSIS

Data collection is the main work of the research. The whole research was carried out at**Shree BalaJee Graphic, Hisar**. The 200 sheetswere printed with dry electrophotography printing process of the different dot shapes (Line and Round) and first 100 sheets of the line dot shape and last 100 sheets of round dot shape. Data collection is based onevery 5th sheet which is printed by dry electrophotography. The data collected by the x-rite spectrophotometer and the Print Contrast measured on the 70%, 50% and 20%. After the collection of data, we analyze the data with the help of charts and tables.

4.1 Print Contrast

Print Contrast is measured of black, yellow, cyan and magenta color at 70%, 50% and 20%.

Table.4.1 Print Contrast in Line and Round Dot Shapes at 70%

Print Contrast (70%)				
	K	Y	C	M
LINE	76	64	59	55
ROUND	75	64	55	53

Table.4.2Print Contrast in Line and Round Dot Shapes at 50%

Print Contrast (50%)				
	K	Y	C	M
LINE	85	80	74	73
ROUND	85	79	72	72

Table.4.3 Print Contrast in Line and Round Dot Shapes at 20%

Print Contrast (20%)				
	K	Y	C	M
LINE	85	96	89	91
ROUND	85	92	89	90

4.2 Data Analysis

The date obtained from 200 printed sheets and take 5th sheet for measuring the Print Contrast and analyze the data with the help of graphs.

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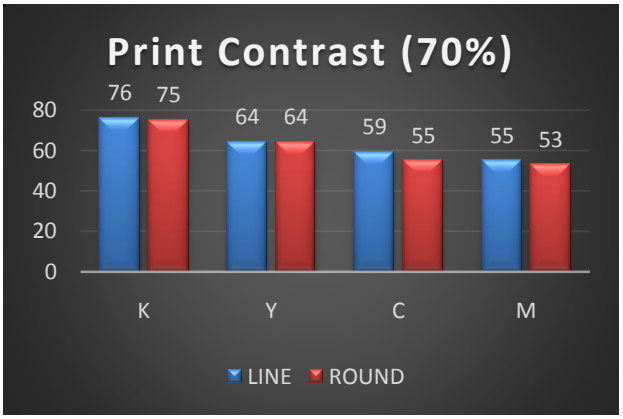

Chart.1 Print Contrast at 70%

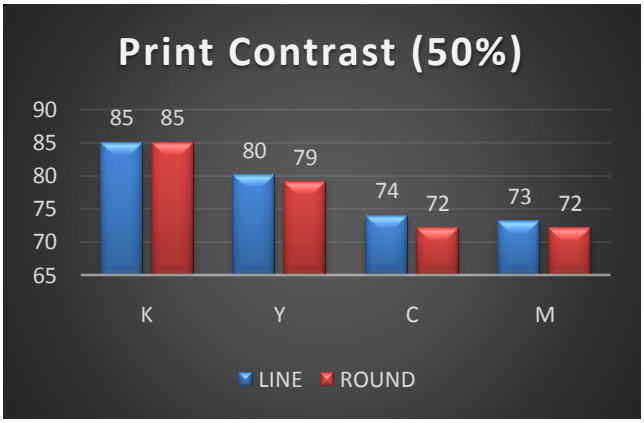

Chart.2 Print Contrast at 50%

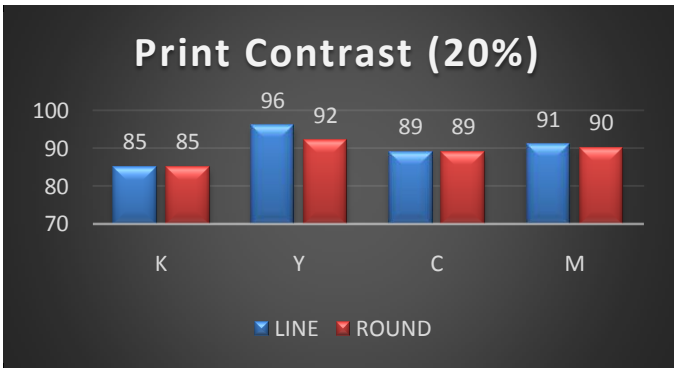

Chart.3 Print Contrast 20%

V. RESULT AND DISCUSSION

Chart.1 shows that print contrast of black (K) color is near about similar at 70% of line dot and round dot shape. The print contrast of yellow (Y)color is same at 70% of line dot and round dot shape. The print contrast of cyan (C) color is high of line dot shape at 70% as compared to round dot shapes. And the print contrast of magenta (M) color is near about similar at 70% of line dot and round dot shape.

Chart.2 shows that print contrast of black (K)coloris same at 50% dotof line dot and round dot shape. The print contrast of yellow (Y) color is near about similar at 50% as of both dot shapes. The print contrast of cyan (C) color

is near about similar at 50% of both dot shapes. The print contrast of magenta (M) color is near about similar at 50% of both dots.

Chart.3 shows that print contrast of black (K)color is same at 20% of both dot shapes. The print contrast of yellow (Y) color is high of line dot shape at 20% as compared to rounddot shapes. The print contrast of cyan (C) color is same at 20% of both dot shapes. The print contrast of magenta (M) color is color is near about similar at 20% of both dot shapes.

VI. CONCLUSION

In this research we found that the different halftone dot shapes affect the print quality of the printed sheets. In the print contrast of line and round dot shapes the value of c, m, y, k is different at 70%, 50% and 20%. The print contrast of black color maximum at 70% as comparison to yellow, magenta and cyan color in both dot shapes. The print contrast of blackcolor is maximum at 50% as comparison to magenta, yellow and cyan color in both dot shapes. The print contrast of yellowis maximum at 20% as comparison toblack, cyan and magenta color in both dot shapes.

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