

# Study of Print contrast in different Dot Shapes of Halftone on Print Quality based on Dry Toner Electrophotography Digital Press

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**ABSTRACT:** Digital printing process is a widely used printing process for small run jobs and high quality printing now a day. There are two types of digital printing processes i.e. Liquid toner and dry toner. In this paper, we studied about the effect of different dot shapes of halftone on print quality factor (Print Contrast) in dry toner digital press. The sheets were printed with different halftone dots (diamond, elliptical, square). The collected data is represented in a meaningful way so that clear difference can be seen.

**Key Words:** Print contrast, Digital printing, Liquid toner, Dry toner, Halftone Dot, Diamond, Elliptical, and Square

## 1. Introduction

The electrophotography printing process is done in five steps that start from (1) charging a photo receptor belt or drum with a coroton or scorotron.; (2) exposure with light a 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 substrate Corotrons rollers are used to transfer the toner on the photoreceptor to 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 technique that simulates continuous tone imagery through the use of dots, varying either in size or in spacing, thus generating a gradient-like effect. "Halftone" can also be used to refer specifically to the image that is produced by this process. This reproduction relies on a basic optical illusion: the tiny halftone dots are blended into smooth tones by the human eye.

## 2. Research Objective

To study & analyze the effect of different halftone dots (Elliptical, Square & Diamond) on print quality factor of print contrast in multi-colour Dry Electrophotography digital press.

## 3. Research Methodology

The master chart is made with the help of suitable tools and images according to the requirement of the research. The sheet was printed with dry toner electrophotography with different dot shapes (diamond, elliptical, square). 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                            | 840mm(W) * 831mm(D) * 1212mm(H)       |
| Weight                                | 295kg                                 |
| Copy with single-pass duplex scanning | 200 images per minutes                |
| Media Types                           | Coated, Uncoated, Tabs, Envelops etc. |

## 4. Data Collection and Analysis

Data collection is the main work of the research. The whole research was carried out at Shree Bala Jee Graphic, Hisar. The sheet was printed with electrophotography printing process with the different dot shapes (diamond, elliptical, square). Data collection is based on the find out the dot gain value of every 5th

sheets which is printed with different halftone dot shape (diamond, elliptical, square) with the X-Rite spectrophotometer.

**4.1 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.

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

| Print Contrast of 70% |         |      |      |      |            |      |      |      |        |      |      |    |
|-----------------------|---------|------|------|------|------------|------|------|------|--------|------|------|----|
|                       | DIAMOND |      |      |      | ELLIPTICAL |      |      |      | SQUARE |      |      |    |
|                       | K       | Y    | C    | M    | K          | Y    | C    | M    | K      | Y    | C    | M  |
| Max                   | 77      | 68   | 58   | 57   | 78         | 66   | 58   | 55   | 76     | 68   | 61   | 51 |
| Min                   | 75      | 66   | 55   | 54   | 74         | 63   | 56   | 52   | 73     | 63   | 59   | 49 |
| Av                    | 76.4    | 67.1 | 57.2 | 55.2 | 76.6       | 64.5 | 56.6 | 53.1 | 74.3   | 66.4 | 59.9 | 50 |

Table.1 Print Contrast in Diamond, Elliptical and Square Dot Shapes

**4.2 Data Analysis**

Data is obtained from the printed sheets.

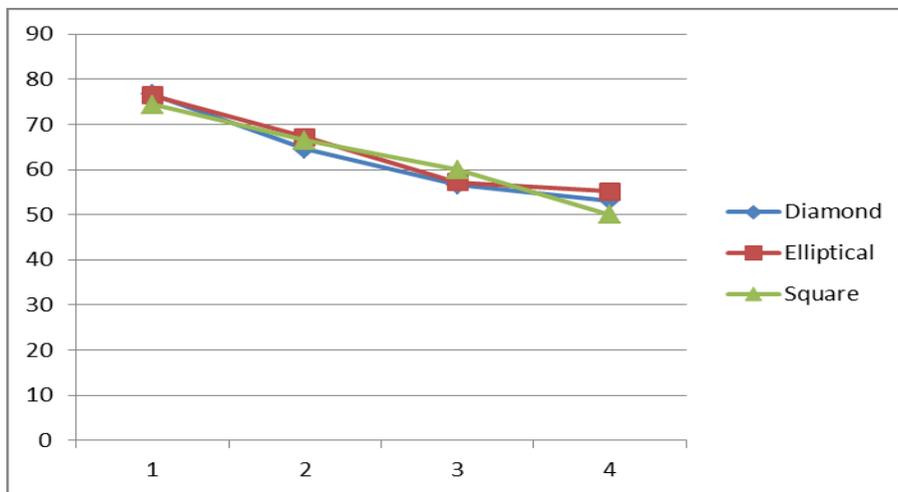


Chart.1 Print Contrast of Diamond, Elliptical, Square dots

**5. Result and Discussion**

Chart.1 shows that print contrast of black (K) color is high of elliptical dot shape as compared to diamond and square dot shapes. The print contrast of yellow (Y) color is high of diamond dot shape as compared to elliptical and square dot shapes. The print contrast of cyan (C) color is high of square dot shape as compared to diamond and elliptical dot shapes. The print contrast of magenta (M) color is high of diamond dot shape as compared to elliptical and square dot shapes.

**6. Conclusion**

In this research we found that the different halftone dot shapes affect the print quality of the printed sheets. In the print contrast in diamond, elliptical, square dot shapes the value of c, m, y, k is different. The print contrast of diamond dot shape is highest in most of the colors.

**7. References**

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