

ABSTRACT

In digital printing, an image is sent directly to the printer using digital files such as PDFs from graphic software such as Illustrator and In Design. This eliminates the need for a printing plate, which is used in offset printing, which can save money and time.

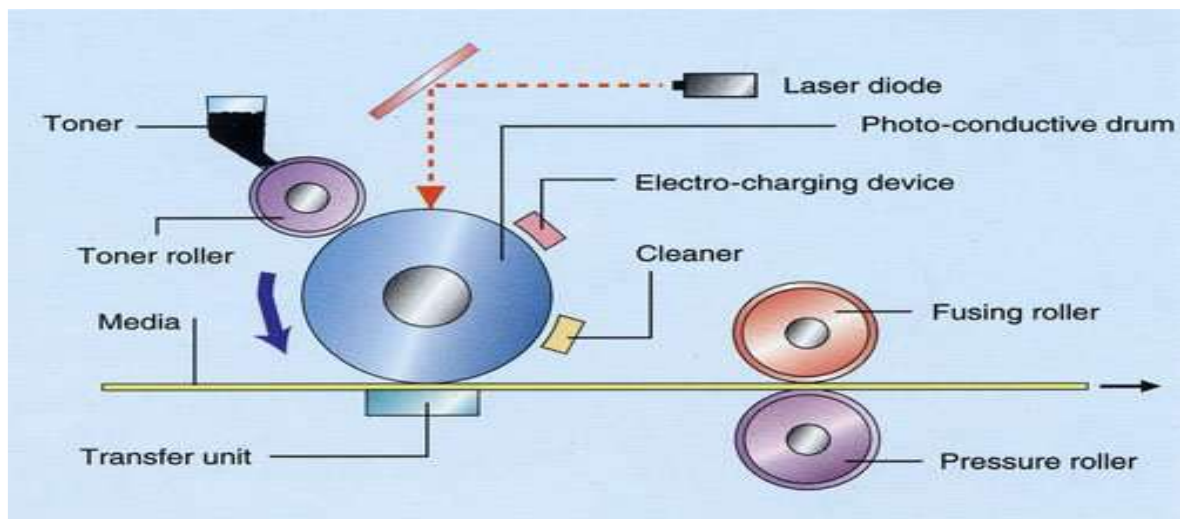
The digital printing can be classified in to mainly four categories

- Silver halide process
- Inkjet technology
- Thermal printing
- Electro photography

Non-impact printers print characters and images without any physical contact between the Printing mechanism and the paper. Non-impact printers are generally much quieter than impact printers since they don't physically strike the page.

I. INTRODUCTION

Electro photography is a toner based digital printing technology. Electro photography is a photocopying technique based on the principle of electrostatic charge.



The electrostatic charge is applied to the selenium plate which means the photo conductive drum. Based on electrostatic principle the charge is fully applied on to the surface of the selenium photoconductive drum and the laser beams are used to selectively discharge that electrostatic charge. The charge exist in some areas will receive the oppositely charged toner powder. The non image areas will not attract. The toner on drums will be transferred on to the paper and heat fused.

Liquid electro photography uses the liquid medium in which the toner is dispersed. And that that will be applied to the drums and the charged areas will receive the toners. The dry toner photography will use the dry toner for imaging purpose.

II. PRINCIPLES OF ELECTRO PHOTOGRAPHY

The actual printing process in electro photography is carried out in four steps.

1. Imaging

The fully charged photoconductive drum is imaged with laser beams to develop a latent image.

2. Inking

The oppositely charged toner is applied to the charged drum and latent image is developed.

3. Toner transfer (printing)

The developed toner is transferred to the paper and the actual printing is carried out here.

4. Toner fixing

In this unit the charged toners are heat fused over the substrate surface.

Offset Printing

The offset printing is a planographic printing process where the image area and non image areas are in same plane. Both the surface are separated by the natural principle, "water and oil do not mix together.

Offset printing process is a chemical process. The transfer of the ink from the image area is controlled by maintaining balance between ink and water.

This is also known as indirect process of printing. The offset process of printing was discovered by a lithographic printer in 1905. He was an American named Ira Rubal.

Working Principle

In offset printing process, the image is not directly transferred from the printing plate to the paper. First of all, the image is transferred to an intermediate cylinder, called blanket cylinder. The image from blanket cylinder is printed on the paper which is wrapped on the impression cylinder. Hence the offset printing machine requires three cylinders.

Plate Cylinder

An aluminum or bimetal plate is mounted on this cylinder. The plate causes the image to be printed. Dampening and inking rollers are set in contact with it. The plate cylinder revolves along with the dampeners and inking rollers. Water layer is formed by the dampeners on the non-printing areas. Ink layer is formed by the inking rollers on the printing areas.

Blanket Cylinder

The tooth of the gears on the both the side of the plate cylinder and blanket cylinder mesh and cause both cylinder to be rotate together. The ink applied on the image area of the plate gets transferred to the blanket cylinder because it has the ability to get printed on rubber surface. The image printed on blanket cylinder becomes opposite to the plate cylinder.

Impression Cylinder

This cylinder cause the printing paper to rotate along with itself and it applies pressure on the blanket cylinder. The ink on the blanket cylinder has gears on both sides, which are connected with each other.

Different units of offset printing machine

In feed Unit

This is the first unit where the paper substrate to be printed is placed and feed into the machine .The paper to be printed is well jogged and placed on the pallet. The paper is separated on the pneumatic and mechanical principles and that has passed between the introductions rollers. Then the paper is moved over the feed board

along with the many sheet control system such as brush wheels, steel balls etc .The paper is properly registered on front and side wise and transferred to the printing unit through a gripper mechanism.

Printing Unit

Printing unit consists of the three cylinders and inking and dampening units.

Three are plate cylinder, blanket cylinder and impression cylinder. The inking unit comprise an ink duct and a series of rollers that may take ink, grind it, and then apply the very thin layer of uniform even ink to the plate on plate cylinder. The dampening unit has the duct and series of rollers to apply the water to the non-image area on the plate.

Delivery Unit

This third and last unit in printing machine where the printed papers are delivered. There are different types of addition equipments such as spray powders; driers etc are used to prevent the printing problems such as set off.

III. RESEARCH OBJECTIVE

If all parameters are even the relative humidity and temperature are constant, all printers and customers trust the all printed products from one machine will be same based on its densitometry and colorimetry. The aim of this research is to conform that the printed image taken one machine every day is the equivalent replica of the original.

1. To study the colorimetric & densitometry parameters of the printed product from the electro photography.
2. To study the colorimetric & densitometry parameters of the printed product from the sheet fed offset printing
3. To analyze which printing process will give the good consistency.

IV. RESEARCH METHODOLOGY

The whole research is to be carried out in the department of printing technology, **Vikas publication Pvt. Ltd. from Delhi**. The papers to be printed will be place in the machine room condition for 24 hours. The machine will be properly calibrated for the color management and type of paper to be printed for digital printing machine. The coated paper is printed on both the digital printing machine and sheet fed offset printing machine.

Type of Paper

1. Art gloss coated paper

Print Quality Parameters

1. Density
2. Gray Balance
3. Hue Error
4. Solid Ink Density
5. Dot Gain (TVI)
6. Trapping
7. Contrast
8. CIE LAB

V. FUTURE & SCOPE

The result obtained from the spectrophotometer will be analyzed to find out any variation happened in the colorimetric and densitometry parameters. This discovery will helps to identify the problem related to such variation the required adjustment to be carried out on the machine according the type and the time periods..

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