



RESEARCH ARTICLE

NANOINK: THE RECENT TECHNOLOGY OF NANOGRAPHY AND XEROGRAPHY

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ABSTRACT

This paper reveals about the new revolution in printing Technology brought by the usage of NanoInk particles. The ink is made of water based volatile compounds and doesn't contain any hazardous air pollutant. These ultra small NanoInk pigments have the ability to form a very thin layer of ink which has the ability to form a very thin layer of ink which enables digital printing at very high speed and high optical uniformity with scratch resistant image. Therefore NanoInk colorants are used at the Landa Nanographic printing process. Finally there's a discussion about its advantages and disadvantages.

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INTRODUCTION

Benny Landa brought a new revolution in the printing field of nanography. This technique allows an entirely new paradigm for competent and profitable printing. Nanography allows you to migrate mainstream application to digital production. It combines quality, speed and cost with production formats and an unlimited range of paper types. Moreover, the nanography creates new business opportunities for providers of any type of printing in the commercial, packaging and publishing markets. The technology uses ink injectors instead of inkjet heads. It prints to any substrate, including flexible packaging and runs at 11,000 sphere and is scalable to cover all formats. It has removed the need for drying machines and extra pre-coatings. Now, the printed layer is of half micron thickness and ink consists of pigment particles of ten nanometers. As a result, the company claims that Landa Nanographic printing is characterized by ultra sharp dots of extremely high uniformity, max. Gloss fidelity and the broadest CMYK (Cyan Magenta Yellow Key).

MATERIALS AND METHODS

Core of Nanography-The Landa Nanoink

Estimation of Size of NanoInk Pigments

It measures just ten nanometres whereas good value offset inks have a typical size of 500 nanometers which is ten times larger.

Thin and a Dry Ink

No more paper cackling is there. Landa NanoInk droplets ejects with precise time on a heating blanket. They spread and quickly lose their water content. Now dry ink dots forms a very thin layer of 500 nm. This thin layer is transferred as dry polymeric film on substrate where it literally laminates the paper without penetrating fibers.

Gloss, Uniformity and Roundness

The thin and dry layer permits low ink lay down. This accounts for its ability to match the gloss of the paper and produce dots with suer sharp edges and high optical uniformity. Therefore dots produced with this technology are exceptionally round.

Characteristics of NanoInk Pigments

Extremely powerful absorbers of light extreme color purity, edge sharpness, high image density and uniformity - sharp offset printed dots with ultra high uniformity

Broadest CMYK (Cyan Magenta Yellow Key)

Pigments being extremely small provide a dynamic light range in nanographic printing and covers more panton colors rhan offset printing. Moreover, nanography Landa NanoInk creates printed solid areas with density values incomparable to other printing technologies.

Fastest Printing

Dry ink enables digital printing at very high speed on ordinary coated or uncoated paper and practically on any plastic packaging film or label.

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Nanographic Printing Process is Media Friendly

Being water based ink is less costly than UV based inks and is eco-friendly. Due to NanoInk an unparalleled thin layer of ink is developed which enables substrate to retain its original after printing.

Green Ink, Green Paper

There are no hazardous air pollutants in Landa Nanoink unlike conventional inks since the ink is simply water based. Volatile Organic Compound (VOC) are not an issue either.

Smart and Eco-responsible Printing

The ability to print short runs means consumer order the exact quantities they require. This saves on the use of resources thereby reducing production waste a smart, responsible and eco friendly system.

Energy Efficient

It takes less energy to dry images produced by Nanographic printing technology compared to aqueous inkjet. Also the Nanoink colors are dispatched as a concentrate and only need to be mixed with water for usage. This method avoids unnecessary shipping of water saving space reducing the carbon impact on our planet.

Media friendly

The ultrathin nanographic printing ink film has an extraordinary ability to bond to all paper and plastic substrates. Due to this, Landa Nanoink can easily be applied to a wide range of sheet or web substrates including plastic, news print, film and many more.

RESEARCH METHODOLOGY

Process of Nanographic Printing

The Nano graphic printing process begins with the jetting of billions of droplets. However the droplets are not ejected directly onto the substrate as they are in the traditional inkjet process. Instead they are ejected onto a blanket from ink ejectors that are mounted on print bars, onto a blanket positioned 1-2 mm away. These are equipped with eight print bars and are capable of printing up to eight different colors. The eight print bar configurations allows having two color bars for each color, which in combination with doubling the paper handling system speed, allows doubling the productivity while maintaining the print quality. The ink droplet injection is timed in such a way that there is high accuracy between print separations. As each ink droplet lands on the heated blanket, it spreads and very quickly loses its water, becoming thicker as it does so.

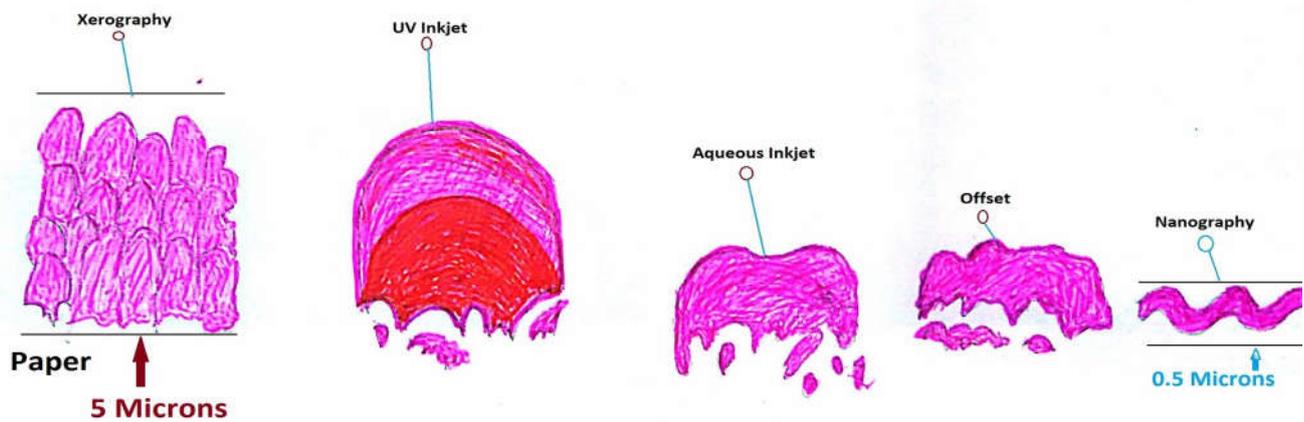


Fig 1 Graphical Representation of Different Technologies

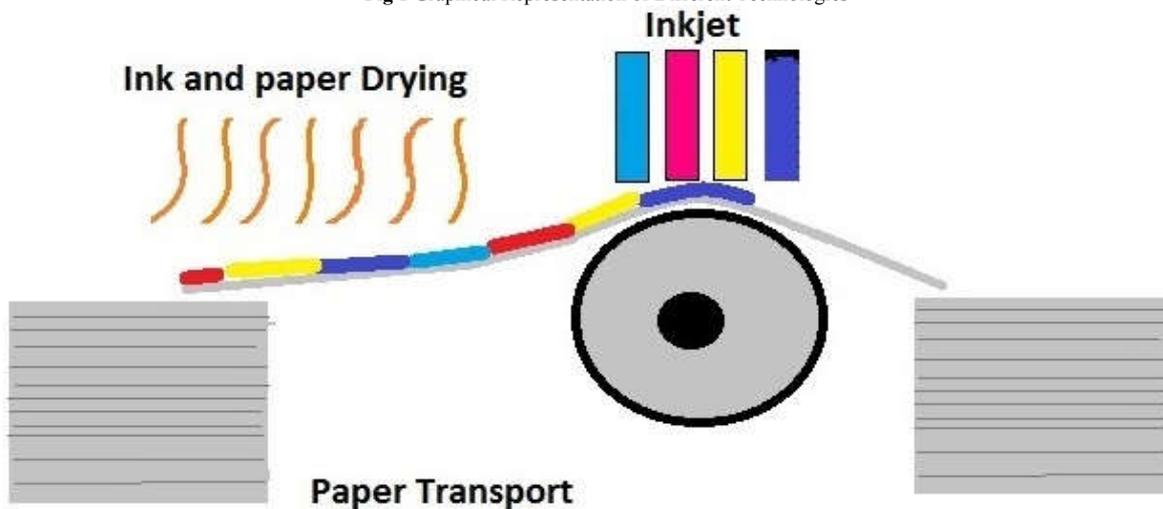


Fig 2 Inkjet-Water Based

Ink becomes an ultra thin when it is fully evaporated. When pressed into contact with printing substrate upon transfer this layer of ink instantaneously bonds tenaciously to substrate. The formed images do not need post drying and leave no residual ink on blanket. Hence two sided printing becomes simple and printed output can immediately be processed.

RESULTS AND DISCUSSION

In figure (1), it shows that Nanography printing is better than other graphical representations as micron size increase from Nanography (0.5 Micron) to Xerography (5 Micron). From fig (2) shows that (Inkjet Water Based) is useful for Ink jetted directly onto paper, wet image soaks substrate, required absorbent substrate and limited area coverage. In fig (3) Nanography Landa shows that Ink is ejected onto paper, dry image transfer to substrate, can be applied to any substrate and unlimited area coverage.

extremely high uniformity and high glass fidelity covering at least 15% more Pantone colors than offset printing. Elimination of Absorption of the liquid ink carrier by the substrate helped in achievement of many advantages. Moreover it forms a dry ink film unlike other directly applied wet inks. With this detection, the Landa Nanographic printing process bridges the profitability gap with the strong combination of low operating costs, high speed sand media support than digital. It's a solution that enables print providers and converters to use digital printing for mainstream applications. It is thus the future of printing technology.

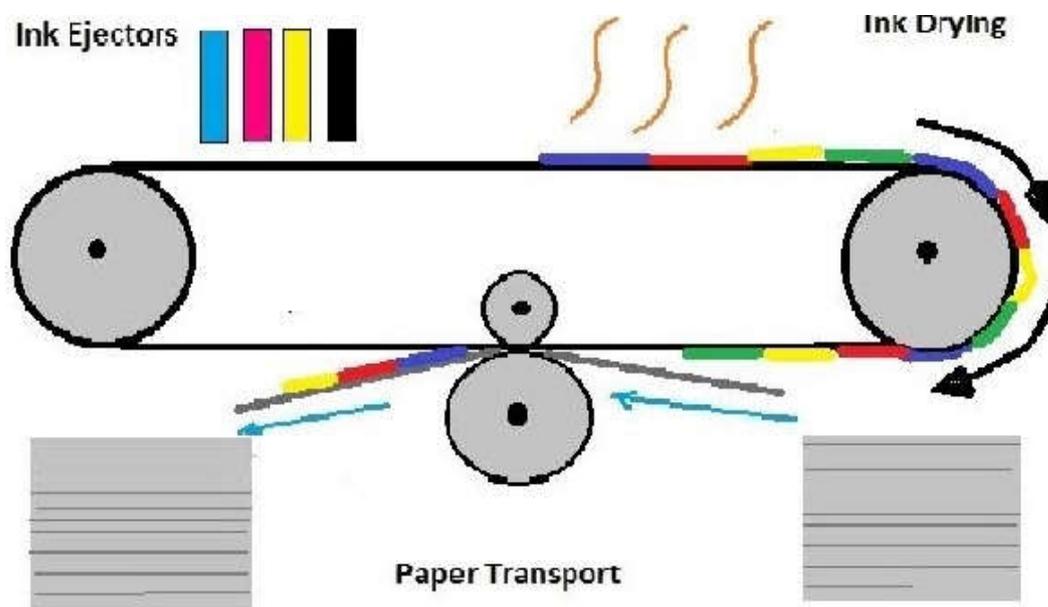


Fig 3 Nanography

Economic Advantage

The Nanographic printing offers the capacity to yield lowest cost per page which thus becomes very economical. This is due to various aspects relating to underlying technology.

1. Energy consumption
2. Production logistics
3. The ink carrier
4. Amount of ink
5. Substrate cost

This Nanographic printing process allows digital production at up to 13000 B1 sheets per hour for sheet fed and 200 meters per minute for web fed presses. This is nearly 100 % enhancement over other digital printing processes

CONCLUSION

The Landa Nanographic printing process is innovative in that it utilizes the nanosized pigments to absorb much more light than other pigments and thus permits images with ultra sharp dots of

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