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ИССЛЕДОВАНИЕ ХАРАКТЕРИСТИК ОТТИСКОВ, УКРАШЕННЫХ ТИСНЕНИЕМ ФОЛЬГОЙ

В статье исследуются разрешающая и кроющая способности трех образцов фольги на различных видах бумаги при разной температуре тиснения. Установлено наиболее оптимальные параметры для получения качественных оттисков.

THE RESEARCHES OF CHARACTERISTICS OF PRINTS, DECORATED WITH FOIL STAMPING

Devoted to the researches of resolution and coating capabilities of three foil samples on of different types of paper at different temperatures and pressure. The most optimal settings for quality of prints are discovered.

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DIGITAL INK-JET FOR BOOK PRINTING

The article presents the possibility of printing books using digital ink-jet technology. Thanks to the newest solutions in machines and inks production, the quality of printing has improved. What is more, ink-jet as a digital technology can be used in realization of very short runlengths. This is very important issue nowadays. It is expected that in the near future, ink-jet will be the most popular digital technology in book printing.

Key words: *digital printing, ink-jet, inks, digital printing machines, offset technique, publishing papers, nanography*

Ink-jet printing. Ink-jet is a digital printing technology which is used for many types of jobs, i.e. brochures, catalogues, advertising, packaging and books. Research in 2008 indicated that only 1% of all digital prints were books. However the digital printing market, including book producing, is estimated to grow by

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71% from 2008 to 2013 year [1]. The reason of such situation is less number of readers. People live faster and claim they have no time to read books. What is more, they prefer to read shorter texts and often they look only on the websites. Publishers are forced to decrease the runs of books. Sometimes the runlengths are so short that printing them using analogue techniques is uneconomical. In such situation books are produced in digital technique such as ink-jet. What is more, digital printing gives publishers a possibility to print book after they have received an order for it. They can also produce author's publications first only for promotional purposes [2].

In the past digital printing wasn't useful for runlengths longer than 1 500 overprints. Today there are machines which are able to print economically more than 1 500. However, digital technology is the only one which can be used to produce even one overprint. It has also other advantages, such as:

- low cost of production, thanks to no need to manufacture plates,
- fast make-ready,
- quality of printing often similar to the one of offset printing.

Ink-jet inks. Ink-jet machines are able to work with different type of inks: water-based, (eco)solvent, UV, oil-based and latex. In case of book printing, the most useful is equipment with water-based inks. They consist of:

- colourant
- surfactants and additives
- humectant
- water

The last component makes up 65% of whole weight. Humectant is 30%. On the one hand, such inks have low toxicity, but on the other hand, they have slow drying rate.

- 2-8 %of weight is colourant, which can be divided into two groups:
- dye-based
- pigment

Although dye-based inks are capable of achieving a bigger range of colours (called gamut) than pigment-based inks, they are more vulnerable to water and they are fading faster. Pigment-based inks are more stable and more resistant to light and ozone.

Dye is dissolved in the carrier fluid. Pigment is dispersed in this fluid (see: Figure 1) [3].

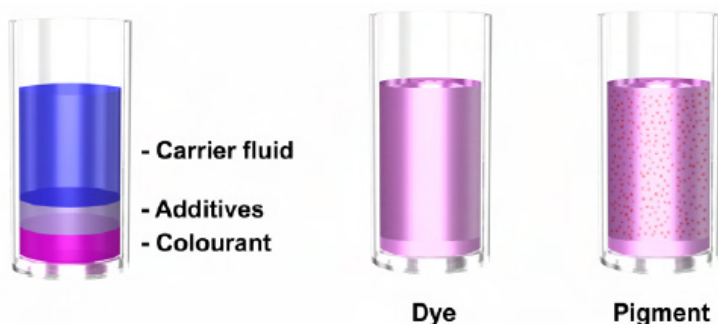


Figure 1: Colourants [3]

Equipment. Many books existing on the market don't have any coloured illustrations. This is the reason why they don't have to be produced by using machines dedicated to colour printing.

There are some new generation monochrome printing devices working with high speed and consume little energy. Such equipment offers Canon Océ. Its JetStream continuous feed solution (see: Figure 2) is able to print non-stop for up to four hours. Producer claims the machine is capable to print with consistent quality and droplet sizes from 5 or 7 to 12 picoliter (depending on the model). JetStream works with water-based dye ink and piezo-electric printheads. It can be upgraded to full-colour configuration. JetStream maximum speed is 254m/min (5500 version). [4]



Figure 2: Canon Océ JetStream Wide [4]

Hewlett Packard (HP) and Koenig & Bauer (KBA) are also producers offering ink-jet devices for book printing. The first company propose its HP T200, T300 and T400 full colour series with possibility of printing monochrome publications (see: Figure 3). Those machines work with pigment inks and HP printheads. They apply colourless liquid on the paper, called HP Bonding Agent, in according to improve optical density, lightfastness and water-resistance. Thanks to this agent, HP machine

is able to print on even uncoated offset paper, which normally isn't dedicated to ink-jet technique. HP T400 maximum speed is 183m/minute [5].



Figure 3: HP T200 Color Inkjet [5]

KBA company during Drupa 2012 presented its new RotaJet 76 (see: Figure 4). This web-fed ink-jet press works with water-based pigment inks and piezoelectric Kyocera printheads. Producer claims that their inks have special consistence which enable machine to print with near offset quality, even on uncoated substrates. Printing on uncoated papers is also possible thanks to the aqueous coater which is applied on their surface. KBA digital printing device can be used for books with colourful photographs or illustrations. Maximum speed of RotaJet 76 is 150 m/minute [6].



Figure 4: KBA RotaJet 76

Book papers. The most popular papers for book producing, called book or publishing papers, are the uncoated and bulky ones. These offset substrates are produced in 60-100 gsm with 1,5-2,2 cm³/g bulky index. Books made from bulky

papers aren't so heavy and it's more comfortable to take them on train or bus.

Whiteness of publishing papers is rather low because it's much easier to read text on less white or even yellowish pages [7].

There is no problem to use such papers in offset machines. However in digital ink-jet printing, there can occur some difficulties. As it was mentioned before, there are different types of digital technique, but the most useful for book printing is the one using water-based inks. Such inks contain a big amount of water. Publishing papers, because of their porosity and absorbency characteristics, after ink-jet printing, can curl, cockle and dry too slowly. However, the producers of digital machines have found the solution by applying special liquids improving surface resistance.

Nanography. During Drupa 2012, Benny Landa – inventor of Indigo Digital Press - presented his new extraordinary printing devices. Those machines work with water-based nanoinks and Kyocera printheads. This modern digital technique is called nanography.

Nanoink consists of nano-pigment particles (size of nanometers). It isn't transferred directly onto substrate, but first it is heated on a special blanket, where water is evaporated. Nano-sized pigment creates on the paper very thin layer and absorbs much more light than other types of pigments (see: Figure 5). These advantages result in a better resolution and bigger gamut of overprint.

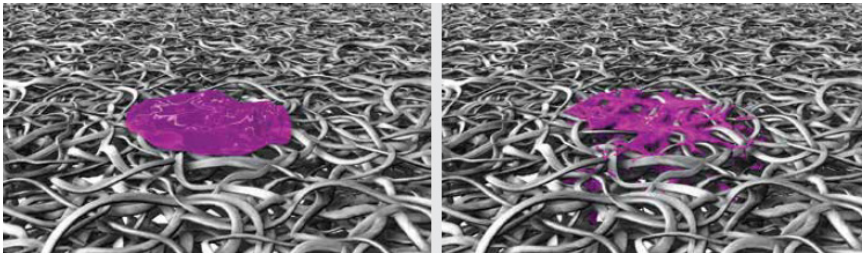


Figure 5: Landa NanoInk vs ink-jet dot on paper [8]

Dots produced in nanotechnology are round and has sharp edges. They are sharper than the ones produced in offset printing (see: Figure 6).

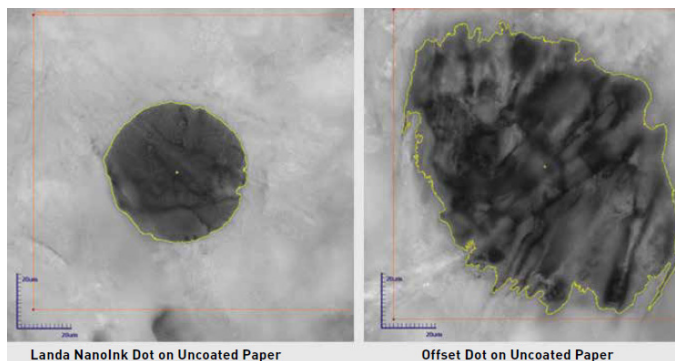


Figure 6: Nanoink dot shape vs. offset dot shape [8]

Nanography doesn't limit the types of substrates which can be print by Landa machines. This new technique is a digital solution not only for books production, but also for packaging, newspapers and many others. However, during Drupa 2012, presented machines didn't work and the visitors could only see prints which had been made before fairs. What is more, Benny Landa admitted he still had been working on his new invention. Nevertheless, nanography is the most modern printing technique and almost all biggest producers of offset machines are interested in it [8].

Summary. Digital ink-jet printing is a solution for publishers who would like to print books in more economical way, without losing a quality. It is a chance also for authors who would like to publish their books first only for marketing purposes. What is more, books printed in digital technique can be personalized, what makes them more attractive to the potential readers.

It is expected that ink-jet printing will be more popular in the near future, especially since Benny Landa's last invention.

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ВИКОРИСТАННЯ ТЕХНОЛОГІЙ ОФСЕТНОГО ДРУКУ І GRAWERTON ДЛЯ ВІДТВОРЕННЯ БАГАТОФАРБОВИХ ЗОБРАЖЕНЬ НА МЕТАЛІ

У статті досліджуються зміни кольорних характеристик відбитків, отриманих технологією GRAWERTON та офсетним способом друку на металевій поверхні.

Ключові слова: технологія GRAWERTON, відбитки офсетні, сенситометричний метод, кольірне охоплення

Як відомо, друк на металі має широке застосування. Таким способом виготовляють: дипломи; сертифікати; спортивні нагороди (кубки, медалі); подяки; почесні грамоти; вивіски; сувеніри; фотографії; мнемосхеми; бейджі; металеві візитки; таблички. Друк на металі широко використовується також при виготовленні металевих паковань [2–4].