WHITEPAPER

SINGLE PASS VS MULTI PASS PRINTING

BERGSTEIN

SINGLE PASS VERSUS MULTI PASS

An explaination why single pass digital printing is an interesting substitute for multi pass printing

We at Bergstein Digital B.V. are convinced that our digital single pass printers are a future proof and time/cost saving solution for direct to shape printing. With this whitepaper we would like to take the opportunity to inform others of the findings that we have collected over the past 15 years. The pros of single pass printing in comparison with multi pass printing.

In some cases, multi pass printing can of course be the best match for your products, whenever number of products are minimal and the product is bigger in size. With single pass printing you are able to ramp up production speed and quantities in a blink of a second.

Review the following bullet points, in which we try to explain why single pass printing could be an interesting substitute for multi pass printing.

[Image of a single pass printer]

PRODUCTION TIME

SINGLE PASS PRINTING

Single Pass Printing makes it possible to print more products in one job, one direct after another. The products pass through the printer with app. 25 m/min and are pretreated, printed and cured when they leave the printer.

MULTI PASS PRINTING

With multi–Pass Printing the product remains on the same position, where the printhead moves right and left over the product and prints the desired design. The production time of printing one product is therefore longer than with single pass printing.

PRE-TREATMENT

SINGLE PASS PRINTING

Due to its modular design, different pre-treatment units can be chosen, which can be mounted inside the printer. Direct after pre-treatment (flame/flame with Pyrosil/plasma/Corona), the product surface is ready to print inline.

MULTI PASS PRINTING

When printing with a multi pass printer, the product needs to be pre-treated outside the printer and then it can be placed on the printer. This influences the production speed and a product needs to be handled double.

LED CURING

SINGLE PASS PRINTING

Changing print jobs and / or print colors are done within seconds. It is only a matter of changing files in the computer, and the printer is ready to print!

MULTI PASS PRINTING

The wattage of the LED-lamp that passes the products multiple times is only 4-8 Watt. It dries the ink slowly. A higher wattage would over-cure the ink and could damage the product. After printing, the ink is dry but sometimes not cured enough for an optimal adhesion. The ink is also developed for these smaller wattages, and other inks cannot be used.

UV-CURING

SINGLE PASS PRINTING

Direct after the LED-lamp, a UV-curing lamp is installed in a single pass printer. With both lamps, the ink will be dried on the top as well as on the bottom. Different wavelengths can be used to achieve an optimal adhesion.

MULTI PASS PRINTING

There is no UV-curing possible inside the printer. If an extra UV curing is needed, then the products should be placed on a conveyor belt with UV curing, which means extra handling.

INK TYPES

SINGLE PASS PRINTING

The choice of different ink types for single pass printing is much broader. In combination with the different pre- and posttreatment and different jet-able primer, numerous different materials can be printed. More robust inks can be used as well as ink with different ingredients like photo-initiators or extra flexible substrates, to achieve a optimal adhesion.

MULTI PASS PRINTING

The choice of different ink types is limited due to the curing aspect (read above) and will affect the adhesion on different substrates enormously. Also the choice of different jet-able primers is limited due to the curing.

PRINTHEADS

SINGLE PASS PRINTING

Different types of printheads can be mounted, depending on the product, print or ink. In a Single Pass printer, also multiple printheads can be placed to increase quality and/or print width.

MULTI PASS PRINTING

There is only one type of printhead in a multi pass printer. If a certain product or print demands another printhead, due to ink or print quality, this is not possible.

SPEED REGULATION

SINGLE PASS PRINTING

The speed of each carrier with its products can be regulated separately resulting in an optimal print result and increase in the production speed.

MULTI PASS PRINTING

Since the printheads are mounted together with the LED-lamps, a speed regualtion does not make any sence. The print and curing are bounded and the speed of printing is as fast as the printhead can move above the product.

CLEAR COAT

SINGLE PASS PRINTING

A product passes through the printer where a clear coat module can print directly after the colors and will cured directly after as well. Speed adjustment of each carrier will take care that the clear coat will have enough time to flow before curing.

MULTI PASS PRINTING

The clear coat can only be printed after all the colors first have been printed and pre-cured. This means that the product needs to be printed again, which will lead to a duplication of the print time.

CONSTANT PRINT QUALITY

SINGLE PASS PRINTING

Due to the design of a single pass printer, products on a carrier will be loaded and unloaded outside the printer itself, while in the same time other carriers with parts are printed inside the printer. There is a continious flow af carriers running on a conveyor belt that are loaded, unloaded and printed!

MULTI PASS PRINTING

Each product needs to placed inside the printer either by hand or automation before you can start to print. After each product is printed, the printer goes to its start position and the printed products can be taken out. Each step can only be done after the previous step has finished.

MACHINE QUALITY

SINGLE PASS PRINTING

Single pass digital printers are built for usage in industrial conditions, where production capacity is high. Because of the speed, accuracy and option choices, these printers are perfectly suitable for the mass production industry. The quality of the used materials as well as the construction of the printers also makes it possible to run in long production hours, even unattended when using pick- and place automations or robots.

MULTI PASS PRINTING

Multi pass printers are built in bigger quantities for general usage in multiple market areas. The printers usually do not print high volumes of products per day but smaller quantities. The quality of the used material on a multi pass printer is inferior and do not stand intense production hours.

[Image of a multi pass printer]

SUMMARY

1. More production in the same time when using single pass;
2. Pre-treatment can be done inside the printer when using single pass;
3. Fast and dept curing because of higher wattage LED lamp, when using single pass;
4. Choice of LED and/or UV-curing lamps when using single pass;
5. Choice of different ink types when using single pass;
6. Choice of different print heads when using single pass;
7. Print speed can be adjusted inside the printer when using single pass;
8. Clear coat can be used direct after the colors inside the printer when using single pass;
9. Loading and unloading outside the printer during printing when using single pass;
10. High machine quality for intensive usage when choosing for single pass;

THANK YOU

FOR READING

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