KOENIG & BAUER KAMMANN: Advances in High Speed Screen Printing

The development of the process for digital printing in order to obtain stable and repeatable decorations with commercial industrial digital printing machines has received much attention in the last few years. Much less attention has been paid to the screen printing process, which has made great developmental leaps within the same time period.

This exploartion of technologies used in the Kammann HS 300 is not a comparison between digital and screen printing: both decoration techniques have their own merits and advantages, and it is a topic to be explored another time. Forthe moment the advancements in the field of screen printing deserve a closer look.

Screen printing has been rediscovered as a tool for producing premium decoration in glass packaging markets, such as beer and soft drink bottles. The sector has shown impressive growth rates, which go above and beyond their expected averages.

These types of bottles are with few exceptions round and have a volume between 200ml and

Koenig & Bauer Kammann in Löhne, Germany, is the global market leader in machinery for the direct decoration of premium quality containers for the cosmetic and food industries. In developing the Kammann HS 300 the company's engineers considered several technological innovation to increase the printting speed.

700ml. Since this is a very specific and clear specification for the products to be decorated, it is possible for a machine manufacturer to design a machine customized to this application.

THE DECORATION PROCESS

Before starting the design of a screen printing machine, it has to be decided which process to use: ceramic or organic (UV/LED) process. In this case it was an easy decision for various reasons. First of all, the use of UV/LED inks do not meet the criteria for adhesion during the filling process. Only ceramic thermoplastic inks offer the adhesion and strength again abrasion, which is required for high speed decoration.

Secondly, although UV technology has matured and is safely curing at production speeds of 100ppm, it still is not possible to cure at much higher speeds, especially on a machine with continuous motion articles transport.

This brings us to the next point.

PRODUCTION SPEED

While the average production speed of machines currently in the market is less than 150 ppm (pieces per minute), the next generation of machines can offer double the speed, or 300 ppm. Why 300 ppm? It has been identified as the most desirable printing speed, because on one hand, this is the level at which in-line decoration becomes viable with with glass production, and on the other hand known and proven infrastructures can be used or upgraded for integration of the new high speed printing machine.

Infrastructure is intended to mean existing screen making processes can be used, the same ink suppliers can offer modified versions of the standard inks and, if necessary, down flow equipment, such as stackers can be upgraded to meet the higher speeds.

MACHINE CONCEPTS

The choice between two common concepts, which is an indexing and a continuous motion type design, is not difficult to make. Machine speeds exceeding 100 cycles per minute typically prohibit the use of indexing type machinery, because of the extremely high forces applied during acceleration and deceleration.

This leaves us with a continuous motion process, which safely allows article transportation at 300 ppm and higher.

FEATURES AND BENEFITS

Optical/camera registration

The light weight glass bottles, which are produced to use less energy and less material, make it impossible to use mechanical type registration, which uses a lug/ramp on the base or on the side of the bottle.

Touchless optical/camera systems are necessary to replace the old process.

A long awaited improvement, which goes along with the implementation of optical/camera systems, is the perfect color to color registration, which mechanical systems simply can not offer.

Dual Squeegees

At speeds of 300ppm, the use of a dual squeegee technology is strongly advised.

The reason is that with 2 squeegee heads per print station, the relative printing speed, which is the rotational speed of the bottles relative to the squeegee during the printing process, is almost the same as the relative printing speed of 150 ppm machines. Again, the advantages are that existing screen technology, squeegees and set up procedures can be used. Additionally, there are no higher instances of wear and tear on the screens, which typically work well at higher speeds.

Ink Pumps

The use of ink pumps, which is rare on standard speed machines with a maximum output of 100 ppm, becomes mandatory on a high speed printer. Ink pumps serve a dual purpose: first by supplying the ink in the exact amount, which is sent to the printing station by programmable dosing; and secondly by holding the correct temperature by means of a controlled heating system in an insulated container. Depending on the print image, a consumption between 1kg and 4kg of thermoplastic ink is not uncommon.

Print Image Inspection

Another mandatory feature is the print image inspection system. Fortunately, the existing systems used on standard machines offered a good base for the development of a high speed system. However, there are differences. In order to match the high speeds without scarifying inspection accuracy, the print image is looked at by the inspection system in 6 segments. These 60 degree segments are inspected individually and put together by software, allowing operators to easily identify potential or actual quality problems. This greatly reduces reject rates and increases customer satisfaction.

All of these advanced high speed options are brought together in the Kammann HS 300, presented as the next great leap in screen printing for speed, quality results and reliable and consistent output.

To position premium products in the highly competitive field of beer and soft drinks, brand owners have re-discovered screen printing as way of decoration, which consumers can easily identify as premium. At the same time, glass manufacturers and decorators are forced to offer this kind of decoration at lowest possible price. To make this possible and profitable, the glass manufacturers/decorators must use state of the art equipment.

As one of the leading manufactures of glass container decoration equipment, Koenig&Bauer Kammann offers equipment to meet these criteria for implementing the process successfully. ■

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