PLASTIC FANTASTIC

Due to its unique properties screen printing is an important technology in the production of bank and ID cards. Dr. Andreas Sohns looks at the options this print process offers for customisation and durability

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Selection of colour shades and special effect colours for NoriCure CCI UV screen printing ink

Bank and ID cards usually have a multi-layer structure made of different plastic materials such as PVC, PET or PC. In addition to the so-called core films, which later form the inside of the card, their structure usually consists of several ink layers, which serve both as decoration and adhesion promoter to ensure the permanent bond of the core and overlay films, which are laminated on as the last layer.

Different printing processes are used to decorate the core films. However, screen printing has always played an important role where special effects, such as metallic effects, are required. It offers the advantage that, when a suitable screen printing mesh is selected, not only very fine but also coarse pigments can be processed and, as a result, effects can be realised that are not achievable with other printing processes.

"Screen printing has become increasingly important where high opacity is required"

In recent years, screen printing has also become increasingly important where high opacity is required, which can be easily achieved due to high possible pigment contents and the comparatively high layer thicknesses compared to other printing processes.

WINDOW FEATURES

One of the emerging applications involving screen printing is the realisation of window features. For this purpose, transparent core films are used, which are then partially printed with a highly opaque, in most cases white, ink. If highly opaque screen printing inks are used, the window area can be left blank, while the printed area hides, for example, RFID [radio frequency identification] inlays and antennas underneath.

Another advantage of producing such windows by printing, i.e. in an additive manufacturing process, is that no further technical equipment is required apart from a printing press.

Dr. Andreas Sohns and his assistant in the Proell UV laboratory in Weissenburg

Signature field printed with NoriCure CCI UV ink

NEW INK SYSTEMS

Solvent-based, water-based and UV-curing ink systems are available for the production of bank and ID cards. In recent years, ink developer Proell has concentrated on the development of water-based and UV-curing ink systems in order to reduce the content of volatile organic compounds (VOCs) emitted during the drying of solvent-based inks as far as possible and thus also take environmental considerations into account.

A decisive breakthrough has been achieved in the field of inks suitable for

"Proell has developed a transfer coating system for non-PVC materials"

lamination, which not only have a decorative function but also create a permanent bond between the core and overlay film, with the development of the two UV-curable ink systems NoriCure CCI for PVC materials and NoriCure EVO for PC substrates. With these ink systems a good cohesion of the material composite can be achieved, and in addition to standard and metallic shades, they also provide highly opaque white colour shades that are ideally suited for the window features described previously. The same applies to AquaCard, Proell's water-based ink system suitable for lamination, newly launched this year, which offers exceptional performance on both PVC and PC

Proell NoriCure EVO UV laminable ink for polycarbonate cards

The service life of plastic cards can be extended by using UV-curing coating systems

substrates in combination with a low VOC content, significantly reducing VOC emissions during processing and drying.

SURFACE PROTECTION

However, customers in the bank and ID card sector are also concerned with further issues. For example, the plastic materials used often have low scratch and abrasion resistance, so the appearance of the cards can be negatively affected within a short period of daily use, thus shortening their service life. This can be remedied by the use of UV-curing coating systems, which are offered by Proell under the name NoriCure CSR and are available in both gloss and matte finishes. The products can be cured with a comparatively low UV dose and, due to their high degree of crosslinking typical of UV-curing coatings, the surfaces offer long-lasting protection against mechanical damage.

THERMAL TRANSFER ONTO NON-PVC MATERIALS

In the area of less complex cards, such as those used as gift or voucher cards, it can be observed that PVC materials are increasingly being replaced by alternative products such as paper cards. However, personalisation and individualisation, which is often carried out using thermal transfer printing, does not work properly – or at all – on non-PVC materials. For this reason, Proell has developed a transfer coating system that can be applied full-surface or partially via screen printing, enabling labelling by the well-established and widely used thermal transfer process.

SIGNATURE FIELDS

Many cards have to be signed by the holder for security reasons or to obtain their validity, which is usually not possible on the overlay film applied as the last layer or on any protective coating that may be present. For this reason, signature fields that are optimised for writing with ballpoint pens or waterproof felt-tip pens are often applied. These signature panels can also be applied by screen printing, for which solvent-based and UV-curing ink systems are available. Signature panel inks

"Signature panel inks are available in almost any colour shade"

are available in highly opaque white to transparent colourless, as well as in almost any colour shade, so that in addition to their functionality they also offer new design opportunities.

CONCLUSION

All in all, screen printing is an important technology in the production of bank and ID cards due to its special properties, which allow, among other things, the realisation of high-quality metallic effects and high opacity, and is usually combined with other printing techniques, especially offset printing. ■

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