PRE PRESS

PICK OF THE PLASTICS

Stefan Bruch details the types of film used in inkjet printing and their applications

Using modern coatings almost all surfaces can be printed on using inkjet technology; this article introduces the different types of film and their properties.

We often come across the abbreviations PE, PP, PVC, PET, A-PET and PC but what do they mean, what advantages and disadvantages do these plastics offer, and what applications are they suitable for? With this information, you will be able to find the right film to meet your requirements.

POLYETHYLENE (PE)

In undyed form PE is dull, milky and matt. It has a wax-like feel to it and can be scratched with a fingernail. Its applicability is limited because it starts to soften at 80°C and melts at approximately 105°C, which can be reached when exposed to strong sunlight. It also suffers from low ink adhesion, restricting its suitability for printing. But PE is used for inkjet applications in the form of a spun-bond fleece (Tyvek). Users take advantage of its high elasticity and climatic stability at temperatures of between -85 and +90°C. The film is also very resistant to acids, oils, brine and alcohol.

In photo papers, PE is used to coat both sides of the base paper. In inkjet printing it is used as a barrier to prevent inks from penetrating into the paper and causing cockling.

POLYPROPYLENE (PP)

Similar to PE, PP is odourless, kind on the skin and physiologically harmless. As a film, PP is stiffer, harder and firmer than PE and plasticised PVC, especially when the film is drawn in both directions during the production process. PP film is usually made into white films with filler materials: with appropriate coatings, they can then be used for various indoor and outdoor applications, such as for banners, in the POS sector, as a self-adhesive alternative and as a vinyl film substitute for signs, information boards and vehicle advertising. In undyed form, it can also be used as a transparent product for short-term light box advertising. Like PE, however, the PP film tolerates a maximum of 110°C and, in contrast to PE films, soon becomes brittle at low temperatures.

POLYVINYL CHLORIDE (PVC)

PVC is the most widely used plastic used in printing. Without the addition of plasticisers, it is hard and brittle. When plasticisers, stabilisers and dyes are added, PVC films can be produced for a broad range of applications, for example as a flexible and stretchable self-adhesive film or as a banner material with an internal plastic fabric. PVC is resistant to seawater and atmospheric influences. It barely decomposes and is therefore largely ground water and environment-neutral when disposed of.

Because highly toxic dioxins can occur when the material is burnt at temperatures below 1200°C, a PVC substitute film is frequently called for. For certain applications a PP film can satisfy requirements.

Films made of plasticised PVC can be divided into three categories:

- Cast films are plasticised with polymers and are cast into their final form during production. Because there is almost no shrinkage as a result of the casting process and only minimal brittleness thanks to the polymer plasticisers they can survive outdoors for up to 10 years.
- Calendered polymer-plasticised films are cast and then rolled out width wise and lengthwise. They have a tendency to shrink, but become brittle very slowly as a result of the polymer plasticisers and can be used outdoors for up to seven years.
- Calendered films made of PVC plasticised with monomers are also cast and rolled out width and lengthwise. Because monomer plasticisers emit gas after a while, these films can be used only for a maximum of five years outdoors. These films have a strong tendency to shrink.

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<th>Application</th>
<th>Type(s) of film</th>
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<td>Roll-up displays</td>
<td>PET, PP, Rigid PVC</td>
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<td>Pop-up displays</td>
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Table 1: Typical applications for different plastic films
PET is a thermoplastic that can be drawn in both directions to between two and four times its original size during a special heat treatment, to produce films that are more rigid and dimensionally stable. PET films are available in transparent, opaque, white, glossy or matt form. They are resistant to high and low temperatures, to light, chemicals and moisture. Thanks to their tear strength, they are indestructible image carriers, e.g. as a bright white film with a block-out coating on the back for roll-up stands, reusable display walls, etc. The crystal clear types coated with a special light dispersing formulation are used, in particular, in lightboxes because they do not become wavy despite fluctuations in temperature and humidity, unlike polyethylene films. They can even be used in office copying machines and laser printers. PET films with an adhesion-promoting pre-treatment (readily bondable) surface can also be printed with UV inks.

Whenever firmness and dimensional stability are required, PET films are always the first choice. The production process, however, is considerably more complex and costly than is the case for PE, PP and PVC films.

A-PET is similar to the PP film, but is generally used only for packaging materials. It is less expensive to produce than pure polyester film.

Another clear, transparent plastic film, PC is used to make CD cases, for example. Like PET, PC is hard and dimensionally stable; it is also weldable and bondable. PC films are pigmented in almost all colours and come in all kinds of surface textures. They can be printed on and are used for identity cards and vehicle displays. PC films are generally more complex and therefore more expensive to produce compared to PET.

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