

Openair®-Plasma optimised printing of plastics

Adhesion guaranteed and yet gentle to the surface

The printing on plastics, like polypropylen or other nonpolar materials, presents everytime a challenge in finding the right chemical composition of the inks.

Today more and more enviromentally friendly, non-poisomous, solvent-free and water-based Ink systems are used. The precondition for their secure bonding is a high wettability of the surface.



Economical use is possible with the following printing processes:

Toys are a challenge for the adhesion of inks in aqueous dye systems – LEGO doll treated with plasma

- Tampon printing
- Silkscreen
- Inkjet printing
- Thermal transfer printing
- Flexo printing
- Offset printing



Pretreatment using the Plasmatreat method is economical and procedurally safe:

Pretreatment of heavily additive filled sealing caps at very high speed in tampon printing



- can be used inline, easy to automate,
- fast (relative speed up to 400 m/min),
- environmentally friendly (no ozone emission),
- controllable according to automotive standards.



Active principle of the plasma method:

Printing on white high-sheen PP is only possible after pretreatment. Openair®-Plasma is surface gentle. The treatment takes place without a "corona" effect. Damage is prevented safely.

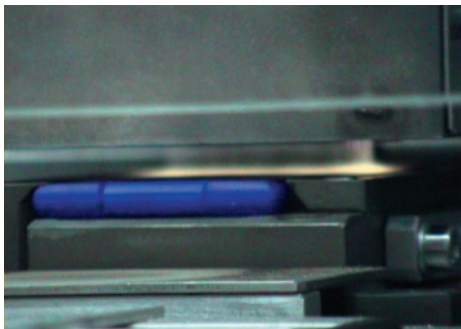
Medical technology applications demand the highest possible ink adhesion and safety guarantees for the differing plastic printing methods.



- **Cleaning** of organic residues (remote cleaning).
- Chemical-physical **modification** of the surface.
- Electrostatic **neutralisation** of the component.
- **Cleansing** the surface of dust particles.

Process engineering

Plastics vary in their ease of activation, some not even requiring pre-treatment to enhance adhesion. Nonetheless, even in these cases Plasma treatment to remove the last particles from the surface does have a significant economic advantage. Others, in turn, react very sensitively and there is a limit to the degree to which they may be activated. Initially, for process evaluation, an adhesive value diagram is worked out characterising each material with regard to its reaction in plasma.



Integration of a RD1004 rotating plasma jet, 35 mm treatment width, in a fully automated tampon printing line

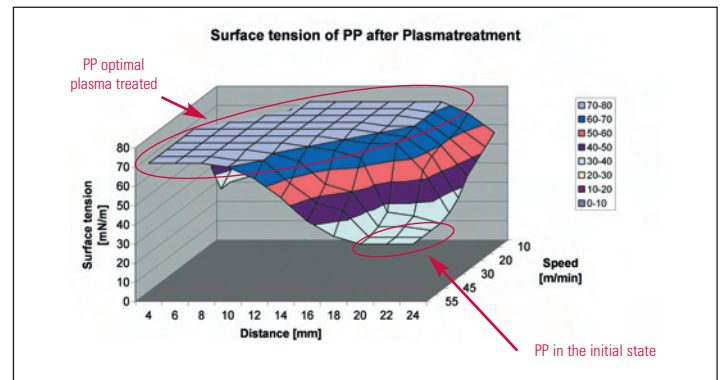
Alternative adhesion solutions

for inks containing heavy metals are urgently needed due to environmental and health protection. If oxygen compounds are added to Openair®-Plasma then the latter, anchored to the surface, can make possible a certain adhesive build-up of organic inks such as occurs in silk-screening, without producing any special wastes.

A wide range of Plasma generators and Jet systems allow the economical use of the Openair®-Plasma technique for a wide range of products.

The new quality of printing concerning particle freeness and bonding pays the process within a short time.

Adhesion value diagram



Implementation

Plasma acts when it covers the surface of the print part with a defined intensity. Relative motion of the surface to the plasma jet is always needed, in the simplest case this is achieved by means of a pneumatic short-stroke cylinder, but occasionally by means of programmable xyz systems.

Plasmatreat would be happy to assist in adaptation design or to offer stand-alone solutions.



With Openair®-Plasma many aggressive solvents and heavy metals are avoided.