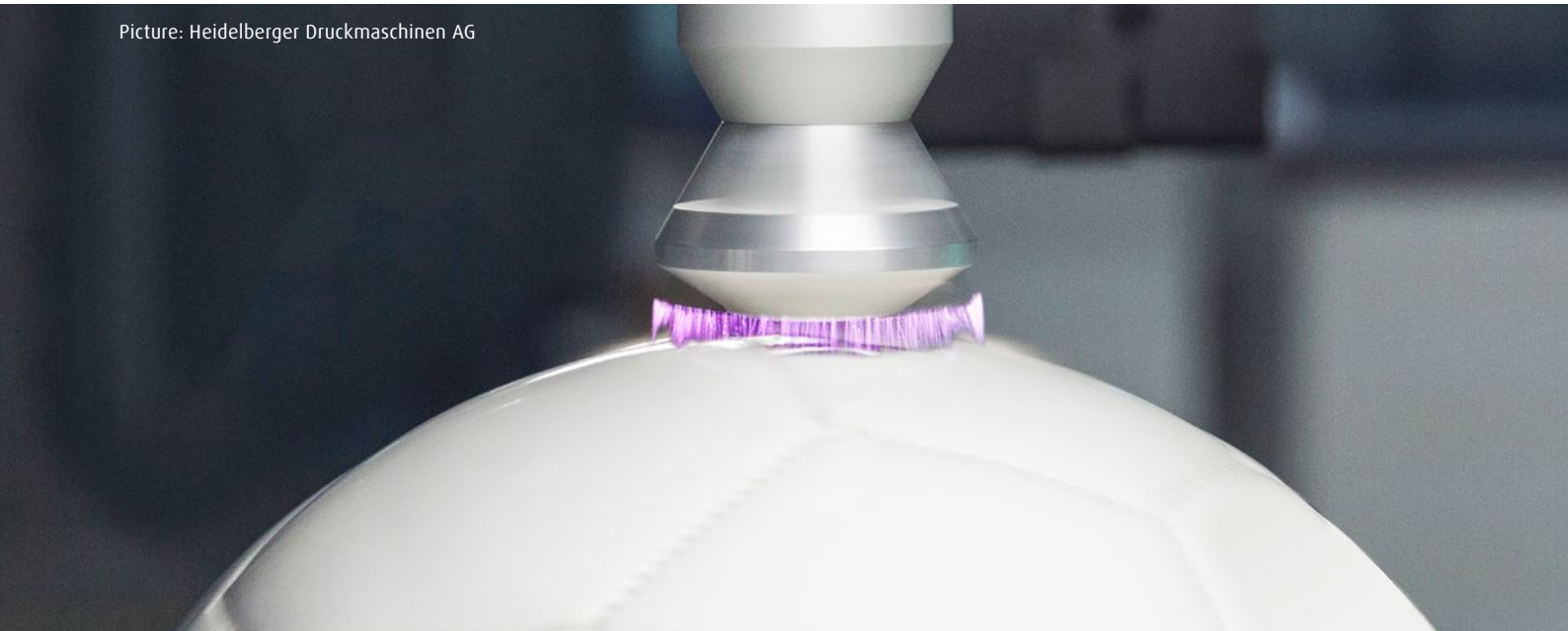


Picture: Heidelberg Druckmaschinen AG



## APPLICATION INFORMATION

# Openair-Plasma® for optimized prints

Gentle surface treatment for guaranteed adhesion

Finding the right chemical ink composition to achieve reliable, long-lasting printing results on non-polar materials like polypropylene, is always a challenging task. Additionally, the use of non-poisonous, solvent-free, water-based inks is steadily increasing nowadays. These environmentally-friendly inks require a high surface energy in order to get a good printing result - a problem that the Openair-Plasma® technology is able to solve.

Openair-Plasma® systems are used in the following printing processes:

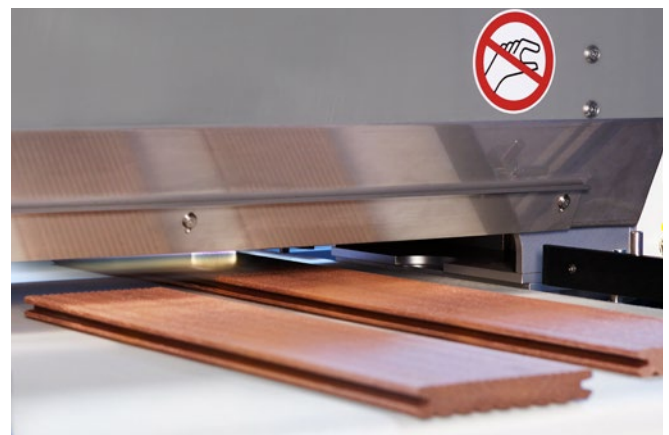
- Tampon printing
- Silkscreen
- Inkjet printing
- Thermal transfer printing
- Flexographic printing
- Offset printing
- Digital printing

Economical & reliable pretreatment through the use of Openair-Plasma®:

- Inline capable, easy to automate
- Fast (up to a relative speed of 400m/min)
- Environmentally friendly (no ozone emission)
- Controllable, compliant to modern automotive standards



Long-term, reliable printing results are especially important for identity documents or licenses. Picture: Atlantic Zeiser



Gentle pretreatment of flat material by our Plasmatreat system PS700

# Openair-Plasma® for optimized prints

## Pretreatment process

Pretreatment using the Plasmamatreat method is both economical and reliable:

- Cleaning of organic residues (fine cleaning)  
physico-chemical nano-modification of the surface
- Electrostatic neutralization of the component
- Removal of any remaining dust particles
- Activation of the surface for subsequent process steps



Left: Printing on glass without Openair-Plasma® treatment.  
Right: With Openair-Plasma® the printing quality is substantially improved.

## Implementation

In general, the Openair-Plasma® technology is implemented by interacting with the target surface at a pre-defined intensity. In order to achieve a specific surface activation there has to be a defined relative speed between Openair-Plasma® Jet and treatment area. Either the Openair-Plasma® jet or the substrate material is moved. Depending on the application and the process, this can be realized via a pneumatic cylinder, or by using a programmable XYZ system.



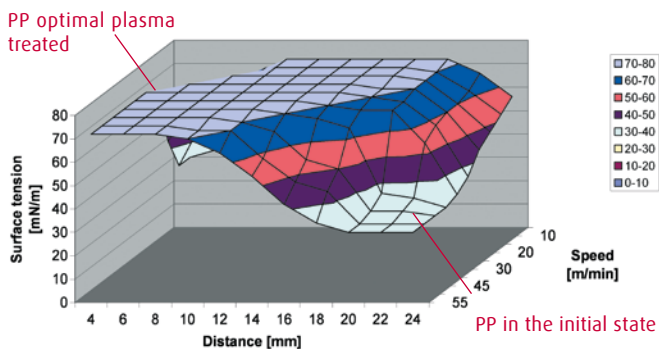
By using the Openair-Plasma® technology, long-term printing results are possible, even on objects that are exposed to high mechanical loads.  
Picture: Heidelberg Druckmaschinen AG

## Process engineering

The Openair-Plasma® activation effect and the increase in the surface-free energy is especially evident on polymer surfaces, where paint systems show a much higher wettability. In these applications, the Openair-Plasma® technology offers a significant economic advantage. Through the broad selection of Generators and Plasma Jets, the particular Openair-Plasma® system can be tailored to the specific requirements and can be used for the economical treatment of a wide variety of products. Through the increased printing quality – by removal of contaminants and improved bonding – Openair-Plasma® systems are quickly paid off.

## Process evaluation

At the beginning of the evaluation of the Openair-Plasma® process window, every material is tested and a diagram is drawn up to determine the specific effectiveness and activation level on that substrate.



Adhesion value diagram

## Alternative adhesion solutions

When using heavy metal print systems, measures to protect Environment and Health need to be put in place to deal with toxic wastes. Through the use of oxygenated process gases, Openair-Plasma® can increase the surface free energy of the substrates to enable the use of organic print systems. This eliminates the need to implement cost-intensive protection measures.



Through the use of Openair-Plasma® many aggressive solvents and heavy-metals can be avoided.

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