

# Lacquering plastics with Openair®-Plasma pretreatment

without additional adhesion agents and thermal treatment

The adhesion of lacquers presents very high demands. Pretreatment is essential for adhesion enhancement of polymer materials. Traditional pre-treatments range from simple flaming, through the use of chemical adhesion agents to mechanical abrasion. Openair®-Plasma offers a new, simple method that activates materials to very high surface tensions,

without complications, using only air and plasma which is formed by a high voltage discharge. High surface tensions are a prerequisite for enhancing adhesion, especially of water-based systems.

## High surface activation

using high internal voltage produces wettability of polymer surfaces to be used with colour systems. In this way

- **there is less solvent in the coatings,**
- **film formation is enhanced, particularly with very thin coatings,**
- **lacquering systems can be used in a variety of ways – such as improving the adhesion to silicon or polypropylene,**
- **materials can still be lacquered flawlessly, even after protracted storage.**



*Optimum wetting, surface tension > 72 mN/m*



*Bumper treated with plasma*



*For many years – a successfully combination*



*Plasma cleaning of PC/ABS cell-phone casings*

## Pretreatment is economical using the Openair®-Plasma technique

- simple to automate by robotic handling,
- fast in application, pretreatment speeds being normally limited by the robot system only,
- environmentally friendly and energy-saving, no ozone, low energy consumption,
- non-hazardous since it is operated without gaseous additives – consequently no explosive mixtures can arise,
- highly reproducible operation as a result of 100% monitoring by means of integrated process diagnosis.

A brilliant example is the lacquering of plastic Motorbike parts with a world wide leading manufacturer. For many years he has successfully combined Openair®-Plasma treatment and water based paints, whereby the productiveness has been raised by 30%.

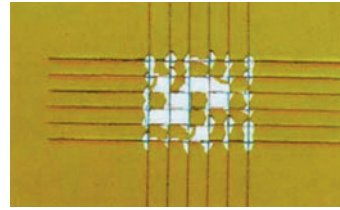
## Active principle of the plasma method

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

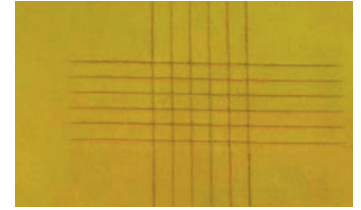
## Process engineering

Different plastics can be differently activated, with others the pre-treatment is not necessary. The Openair®-Plasma- Treatment caused on all tested unpolar plastics a significant adhesion improvement. This is made clear at the results of the displayed cross cut test.

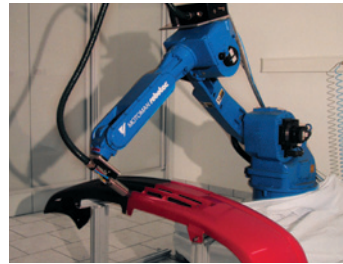
### Cross cut test for lacquer adhesion



*Without treatment*



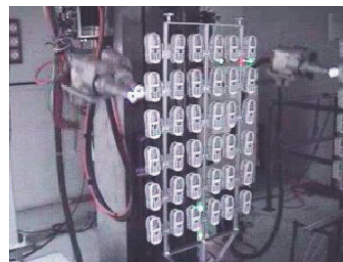
*After plasma activation*



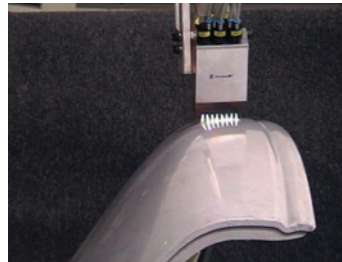
*Industrial robot for pretreatment testing*



*Construction for environmentally friendly lacquering of wiper blades with water based lubricant.*



*Pretreatment of cell-phone shells prior to lacquering*



*W8 plasma generator on a luggage boot cover made of glass fibre reinforced plastic*

## Implementation

Use of the Openair®-Plasma technique is always associated with a relative movement between jet and part. In extrusion constructions the precise jet positioning provides the optimal treatment distance. With the help of industry robots the complete surface of the component are scanned for the lacquering 3D components as well as a complete car body.

## Economically and ecologically

The application of Openair®-Plasma helps to protect the environment effectively. Are surfaces through physically pre-treatment in the NANO-division changed, the added work process with chemical primers can be dropped.

This is very economically because existing constructions can be modified and production can be enhanced, running costs for primers and the appropriate equipment are saved. It is ecologically positive because water based lacquer systems used in a broad coverage. The quality and adhesion are drastically enhanced.

**Through surface-treatment with Openair®-Plasma the chlorinated hydrocarbon, which are often used as solvents, cleaning and degreasing materials, are avoided. These present a big environmental problem. After application parts can reach into the water and air and contribute to the destruction of the ozone layer.**

