plasmatreat
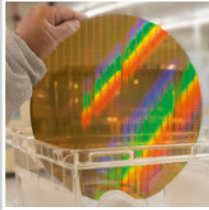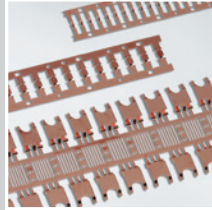
Application range of vacuum plasma and Openair-Plasma® in electronics manufacturing
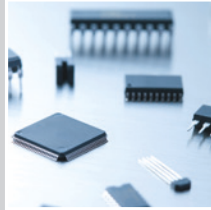
Vacuum Plasma ▬▬ ▬▬ ▬▬ ▬
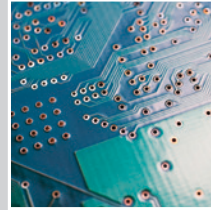
| Front-End | Back-End/Packaging/ Leadframe | Components | PCB manufacturing | PCB assembly | PCB protection |
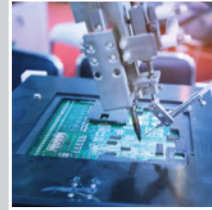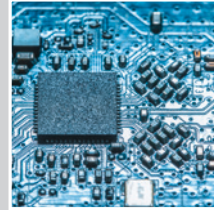
Openair-Plasma® ▬ ▬ ▬ ▬ ▬▬ ▬▬ ▬▬ ▬▬

APPLICATION INFORMATION

Openair-Plasma® in electronics manufacturing

Selective treatment and inline solutions with plasma technology

In the electronics industry, vacuum plasma is an established process for wafer fabrication and pretreating the surfaces of electronic components – but it has technical and economical limitations. In contrast, Openair-Plasma® atmospheric plasma technology facilitates the selective treatment of electronic components and can be fully integrated into standard in-line processes. This reduces process time and costs, since Openair-Plasma® systems are normally operated with clean compressed air. Other gases can also be used, depending on the application.

The special nozzles developed by Plasmatreat work with a residual voltage of less than 0.7 V, which ensures the safe treatment of sensitive electronic devices.

Openair-Plasma® processes

© Fraunhofer IFAM
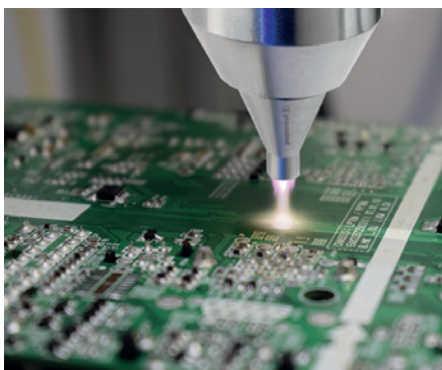
Cleaning

Openair-Plasma® removes all organic silicone-based impurities and electrostatic dust. It provides an effective alternative to VOC-based cleaning processes.
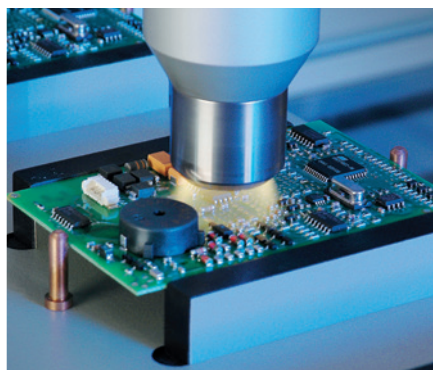
Activation

Openair-Plasma® activates the surface by incorporating oxygen in the form of hydroxyl and ketone groups into non-polar surfaces. The result is high surface energy (over 72mN/m) and complete wettability.
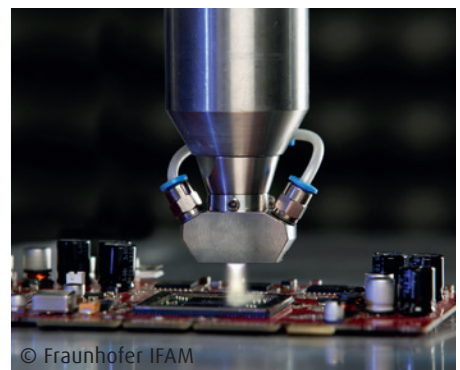
Coating

PlasmaPlus® enables a thin (<< 1μ), solvent-free plasma-polymer coating to be applied to selective areas. It offers maximum protection for circuit boards and LED applications, for example.

The Openair-Plasma® jet is potential-free

Generator Settings:
P = 420 W
f = 21 KHz
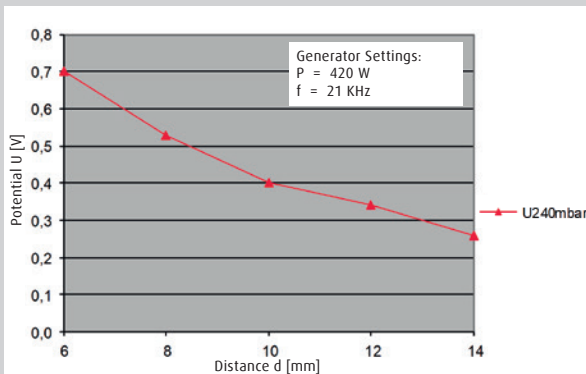
The PCU (plasma control unit) ensures that all parameters are monitored and that identical results are obtained for every treated part.

The specially developed potential-free nozzles allow Openair-Plasma® technology to be used in electronic applications without damaging the electronics.

Leadframe / Packaging

Previously, a time-consuming and costly vacuum process was the only way to remove undesirable oxide layer prior to soldering or bonding processes. Openair-Plasma® microfine cleaning replaces the vacuum chamber in the production of chip packaging. A „reactive plasma zone" integrated into the plasma unit now enables pretreatment to be performed inline in a continuous production process.

Components

MSD levels are extremely important in the manufacturing of components. Making sure components do not absorb any moisture is a key during the assembly process. A PlasmaPlus® coating can help to increase MSD levels by creating moisture barriers, resulting in 100% seal-tight components.

PCB Manufacturing

The circuit board production process is complex and involves several chemical cleaning stages. Most chemical processes can be replaced with the Openair-Plasma® process. Proven applications for plasma technology include pretreatment before laminating and applying a photoresist coating.

PCB assembly

Cleaning circuit boards before screen printing can avoid errors in downstream assembly processes. A pretreatment step with plasma technology enables less resin to be used in the flux, which results in a cleaner process.
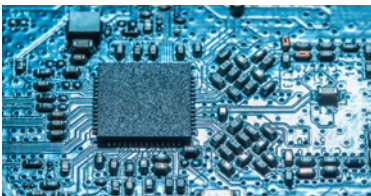
PCB protection

Openair-Plasma® prevents delamination, malfunction during thermal shock testing, bubbles, flow problems, dewetting, orange peel and uneven coatings. The process provides a high-quality bond between the surface and the conformal coating material. The connection achieved by plasma pre-treatment protects electronics even in harsh environments.

Features and Benefits

- Area selective treatment
- High speed treatment, up to 1,5m/sec
- Potential-free: < 1V, can even be used on sensitive electronics

- Cost-effective: low capital and operating costs
- Flexible: can be configured to suit all surfaces (flat or 3D)
- Environmentally friendly: No solvents, no VOC's, CO_2 neutral