APPLICATION INFORMATION

Aerospace applications

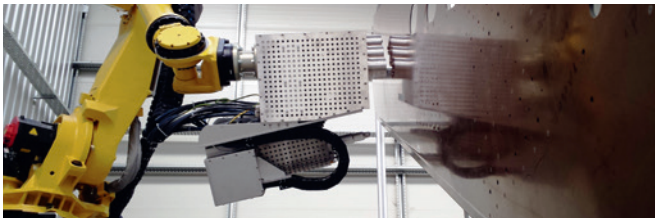
Surface technology for advanced materials uses Openair-Plasma® systems

The aerospace industry has seen a fundamental shift in the materials used. In the past, aluminum alloys were used almost exclusively for the outer shell and the wings. Today, these components are manufactured primarily from carbon-fiber-reinforced plastics. The surface of these plastics must be clean, grease-free and reactive to ensure a reliable, high-strength bond with the coating systems. Openair-Plasma® technology makes it possible for the first time to apply a plasma treatment to these large-format components, since it can be used under normal atmospheric conditions.

The atmospheric plasma interacts with the fiber-reinforced components at molecular level to remove organic impurities and activate the surfaces in a selective way. This creates a durable adhesive bond between the coating systems and the surface, which makes for an especially weather-resistant paint finish. The plasma treatment does not damage the structure of the fiber during this process.

The activating power of Openair-Plasma® technology:

- **Cleans** metal, plastic and composite surfaces. Removes all organic and silicone-based impurities.
- **No solvents or primers:** A plasma treatment often eliminates the need for adhesion promoters, primers and solvents.
- **Surface activation:** The chemical bonding capacity of many materials can be increased by creating reactive, polar functional groups on their non-polar surfaces.
- **Reliable bond:** Plasma treatment improves the bonding of paints as well as the adhesive structure.
- **Stable and reproducible:** High surface energy for long-time stable adhesion.
- **Fast, 100% automated** and monitorable pretreatment ensures more stable, traceable processes.
- **Environmentally sustainable:** Eliminates solvent-based adhesion promoters and allows the use of water-based coating systems.
- **Additional functionalities** can be provided by plasma-polymer CVD and PVC coatings, e.g. corrosion protection and conductive coatings.

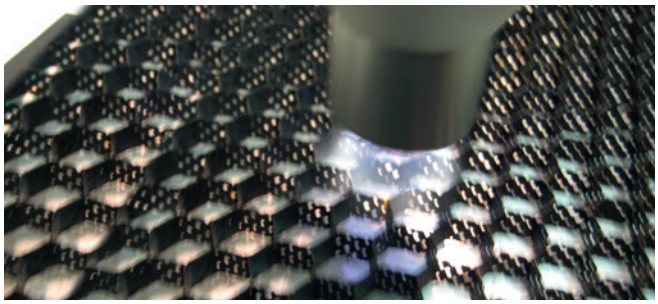


Openair-Plasma® treatment of CFRP components.

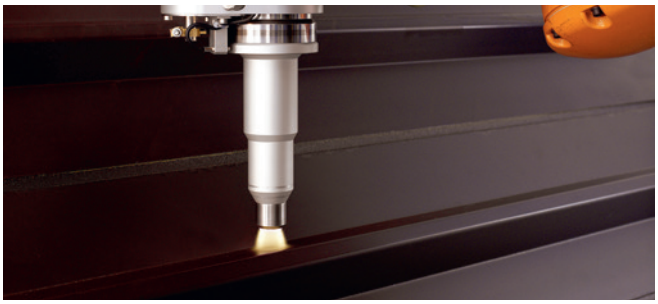
Easy to integrate into existing manufacturing processes

- **Fully automated:** Easy to install and reproducible.
- **Continuous process:** Can be integrated directly into the production line and combined with other production processes.
- **High-speed:** High area output, typically 10sqm/min.
- **Flexibility:** Effective on a range of different geometries, from flat surfaces to complex 3D shapes.
- **No masking required:** Individual adhesive surfaces can be treated without having to mask the remaining areas beforehand.
- **Large process window:** Distance from the surface and relative speed are the main process parameters.
- **Versatile:** Effective on metallic and non-metallic surfaces. Suitable for sensitive electronic components.
- **Affordable:** Relatively low initial investment, very low operating costs.
- **Process control:** With complete process reporting.

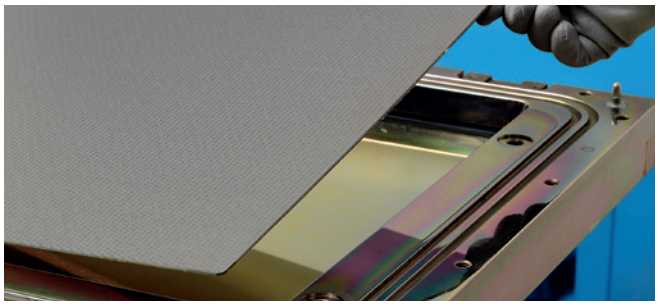
Applications



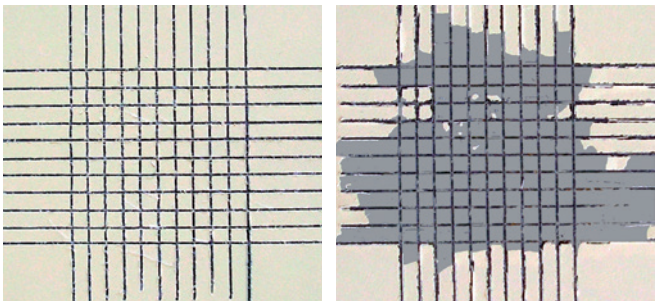
Bonding composite materials: effective activation of sandwich constructions prior to adhesion of outer layers.



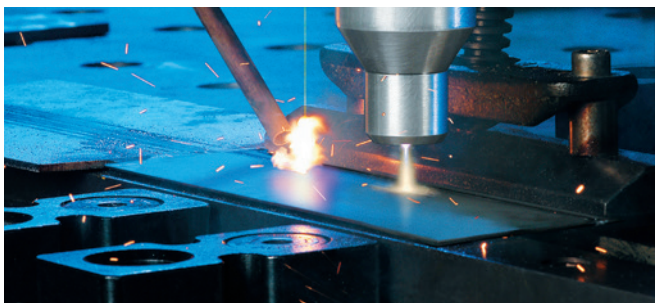
Reliable bond: Openair-Plasma® automates the pretreatment of wing and fuselage parts in aircraft assembly.



Openair-Plasma® allows residue-free parts to be molded without the need for mold-release agents.



Enhanced ink adhesion after plasma treatment – reliable, highly effective activation enables chemically covalent, long-time-stable and weather-proof bonding.



Welding: Removes impurities from metal surfaces to improve seam quality and integrity.

Selective corrosion protection: PlasmaPlus® coatings can make metal c omposite materials corrosion-proof. Does not harm existing, protective oils on the remaining surface.

Plasmatreat GmbH
Queller Str. 76–80
33803 Steinhagen
Germany

+49 5204 99 60 0
info@plasmatreat.de
www.plasmatreat.de

AIDE194_2022_03_01 Aerospace applications