plasmatreat

APPLICATION INFORMATION

High-grade Solar Modules require Professional Pretreatment

Openair-Plasma® provides long-time stable and weather-proof adhesive bonds

Solar modules are essential components of the energy supply, today and increasingly in the future. Given this ever-growing demand, the alternative of fast and cost-optimized high-quality production in large quantities is of decisive importance. Solar modules are subject to stringent requirements. Their service life primarily depends on the leak-tightness of the adhesive bonds and their resistance to corrosion. Penetrating humidity can decrease the efficiency of the module in almost no time.

Reproducible adhesion of the most varied adhesive bonds to the modules is ensured by Openair-Plasma® technology at the highest possible level of quality. The plasma jets can be easily integrated into new or already existing production lines. The key features of this system include high process safety, short cycle times and fast processing speeds. In many cases the use of different material composites would simply not be possible without pretreatment with Openair-Plasma®.

Securely bonded J-box after Openair-Plasma® treatment

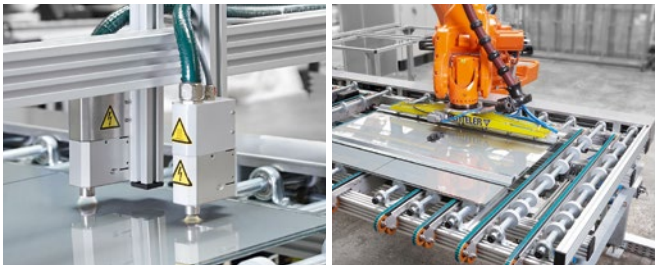


Fig. left: Openair-Plasma® pretreatment of the panel
Fig. right: Adhesive bonding of the components to the treated surface
Source: Benteler Maschinenbau GmbH

The J-box

Specific requirements are imposed on the J-box (junction box). Although it is constantly exposed to the effects of the weather, penetration of humidity or even separation of the box from the panel must by all means be avoided. Secure adhesion of the casting compound to the electronic components and the housing is achieved through plasma pretreatment in the interior of the box. In another process step, the J-box housing is activated from the outside and subsequently bonded to the glass or the EVA foil which has also undergone pretreatment. The sensitive electronics in the interior of the J-box are not affected thanks to the zero-potential characteristic of Openair-Plasma®.

Backrail-bonding

Backrails must securely adhere to the panel. The inline plasma systems developed by Plasmatreat provide effective pretreatment for permanent, secure backrail bonds. Integrated monitoring systems and the control of the plasma intensity and plasma jet allow a permanent monitoring of the production system. The data is transferred to the master computer or the coding of the module via a bus system (Profi-Bus or Ethernet), thus ensuring uninterrupted traceability of the production parameters.

Glass pretreatment

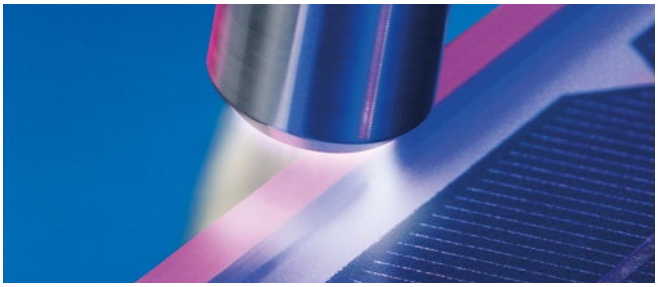
Flawless coatings necessitate an extremely clean glass surface. Openair-Plasma® pretreatment brings about a microfine cleaning effect of the surface. As a result, the wettability becomes homogeneous – which is the prerequisite for a consistent and flawless coating.

Effective corrosion protection

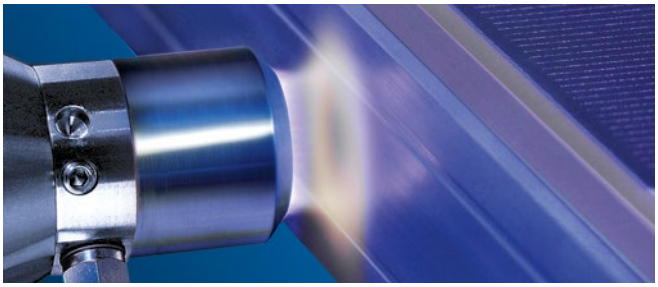
The AntiCorr® coating system is an anti-corrosion coating that is directly applied to the silicon of the solar cell at atmospheric pressure. Besides being environmentally friendly, this process comes with a number of excellent properties.

- The nanometer thick plasmapolymer coating paves the way for special module forms enabling the implemention of more effective and more productive techniques.
- The sensitive electronics of the solar cell are appropriately protected, even if the modules are extremely thin.
- The quality of the AntiCorr® coating is comparable with a coating that is applied at low pressure. It can be optimally bonded in subsequent processes when subjected to post-treatment with Openair-Plasma®.

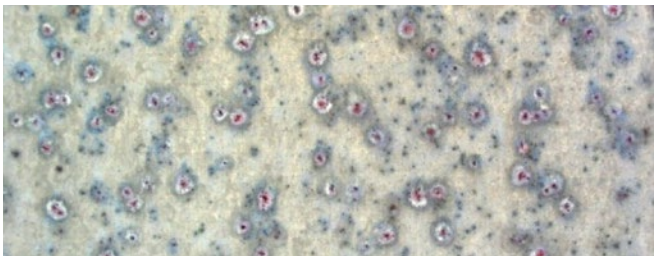
Openair-Plasma® treatment of the glass surface

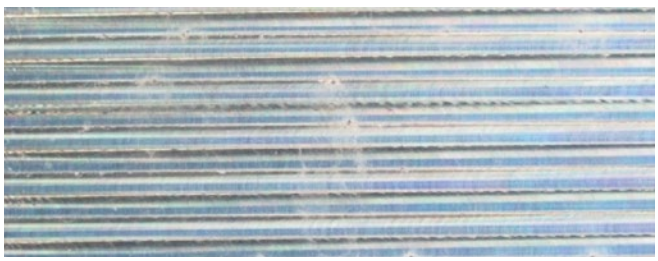


Cleaning of the glass edge



AntiCorr coating of the aluminum frame





Documentation of the corrosion protection level

Photographic documentation (left) after exposure to a neutral salt spray test for 650 hours. Above: Reference without coating. Below: Coating with a high inorganic portion. The corrosion protection level is distinctly increased.

Coating of the Al profiles with the durably stable anti-corrosion coating AntiCorr® that also ensures good adhesion of the adhesive. Penetration of moisture is avoided.
photo credits: Fraunhofer Institut für Fertigungstechnik und Angewandte Materialforschung – IFAM

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