

Fig.1: AntiCorr® coating system for profiles, housings and sheets

APPLICATION INFORMATION

AntiCorr® coating technology

Selective corrosion protection for metals

AntiCorr® is an anticorrosion coating which is applied to various metals in the atmospheric pressure plasma (Fig.1). The coating is part of a range of coatings that can be incorporated into the PlasmaPlus® system.

The AntiCorr coating is:

corrosion-inhibiting

The AntiCorr® coating provides excellent corrosion protection for a wide variety of metals. This coating technology is particularly suitable for aluminum die-casting alloys. Alloys typically used in the automotive sector, such as AlSi12 (Fe), have withstood up to 960 hours in the salt-spray test chamber. This level of protection greatly reduces the common problem of subsurface migration.

suitable for solid and liquid gaskets (FIPG)

Different variants of the AntiCorr® coating are suitable for bonding in downstream processes, or receiving solid seals.

suitable for in-line use

The PlasmaPlus® coating process has been integrated into automotive production lines for several years.

no intermediate storage necessary

No temperature-controlled storage is necessary after the PlasmaPlus® process. The subsequent process step can be carried out without observing drying times directly after the AntiCorr® coating.

versatile

Layers can be deposited on virtually any metal surface. Defined surface roughness requirements are necessary only for enhanced test specifications.

affordable

The AntiCorr® coating process is so efficient that only very small quantities of coating material are required. Area-selective application enables target cycle times to be achieved in a very wide variety of different production lines.

environmentally friendly and recyclable

The AntiCorr® coating is applied without the use of solvents. Any byproducts that arise are non-toxic and can be recycled together with the coated substrate. The thin film thickness makes it unnecessary to remove the coating before recycling.

transparent

The AntiCorr® coating is transparent to visible light, which makes it suitable for optically sensitive areas.

resistant

The AntiCorr® coating adheres extremely well to the substrate and is resistant to diverse corrosive media such as electrolyte solutions, acids and alkalis. This level of corrosion protection is achieved with film thicknesses of approx. 25 - 500 nm. Overall, with the AntiCorr® coating it is even possible to reach better results than with common passivation processes.

Selective corrosion protection for metals

An organosilicon compound is added to the plasma as the starting material for an AntiCorr® coating. High-energy excitation within the plasma fragments this compound and deposits it on the surface in the form of a vitreous coating. The chemical composition of the AntiCorr® coating can be varied according to the application to ensure that optimum results are obtained for any given material. The AntiCorr® coating is comparable with a low-pressure plasma coating in qualitative terms. Typical layer compositions are shown in the following table.

XPS analysis	Atomic-% Carbon	Atomic-% Oxygen	Atomic-% Silicon	Atomic ratio Oxygen/silicon
uncoated aluminum	24,5	75,5	-	
Low-pressure coating on aluminum	13,3	59,5	27,1	2,2
AntiCorr® coating on aluminum	13,3	58,6	28,1	2,1

The REM images of the AntiCorr® coating at 50,000 magnification show a homogenous, pore-free film formation (Fig.2).

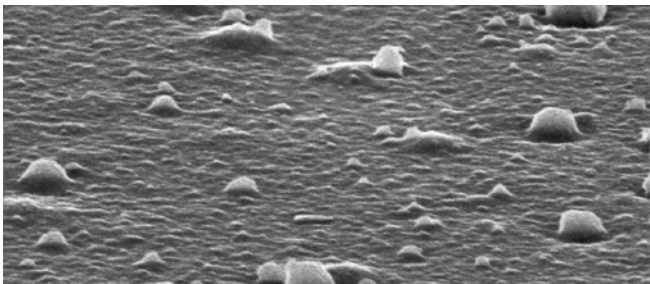


Fig.2: AntiCorr® coating (REM 50,000x)

This shows that the surfaces are effectively protected from corrosive media. Subsurface migration of the coating is avoided due to the very good adhesive properties of the AntiCorr® coating (Fig.3).

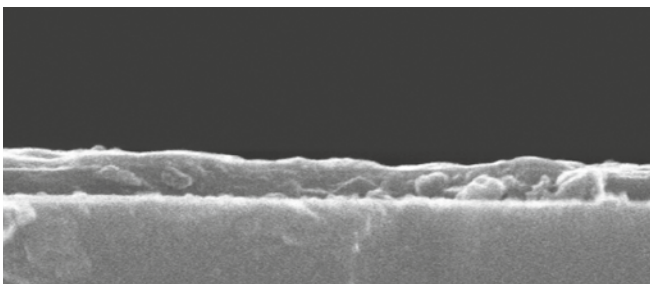


Fig.3: AntiCorr® coating (REM 50,000x, cross-section)

To demonstrate its effectiveness, an AntiCorr® coating was applied to AlSi12 (Fe), an aluminum die-casting alloy typically used in the automotive industry. The test specimens were subject to a 720-hour test cycle under the salt-spray test conditions stipulated in DIN ISO 9227.

Figure 4 shows traces of corrosion on the entire seal face and subsurface migration beneath the peroxide-crosslinked EPDM seal insert. The test specimen in Figure 5 from the same test series shows no signs of corrosion on the seal face due to the AntiCorr® coating.



Fig. 4: Die-cast test specimen made from aluminum alloy AlSi12 (Fe) without AntiCorr® coating (after 720-hour salt-spray test as per DIN ISO 9227)



Fig.5: Die-cast test specimen made from aluminum alloy AlSi12 (Fe) with AntiCorr® coating (after 720-hour salt-spray test as per DIN ISO 9227)

Plasmatreat has extensive experience of industrial applications, the development of plasma-polymer coatings and their application with patented Openair-Plasma® technology.

We will gladly develop a solution tailored to your specific requirements.