

ATMOSPHERIC-PRESSURE PLASMA IN CAR PAINTING

Easier Repair of Coating Defects

Painting defects in car production are often associated with labour-intensive and costly replacement of base and finishing coats. Treatment of the finishing coat with atmospheric-pressure plasma after a targeted repair avoids the very dusty sanding of the paint.

Today painting is still one of the most expensive operations in motor car production, even though optimisation of the spraying process and the widespread use of painting robots have greatly improved the efficiency of paint application. For some years now water-based paints have been employed in series production and more recently in the repair sector also. Over the same period two-coat systems have now come into almost exclusive use in car production.

After application of the primer and a filler for smoothing out any unevenness a base coat is applied as a colour-bearing layer. This is in turn coated with a two-component clear varnish which forms a glossy, high-strength protective layer over the colour. The clear varnish protects the entire structure



Photo Plasmatreat

In tests it turned out that plasma treatment actually improved adhesion between the new base coat and the "old" finishing coat in comparison with sanding

against mechanical, chemical and environmental stresses. This last varnish coat, however, may exhibit defects or damage in production. In this case repainting is the only remedy.

Sanding causes high wastage

Repair or repainting jobs, however, are often a particular headache for car manufacturers and paint shop companies. The essential problem here – and certainly the principal reason for wastage levels in repainting jobs – is the sanding process required in advance. If in final quality control in series production a damaged paint area is found on a freshly painted car body, this car must be given both a new base coat and a new finishing coat. In

order, however, that high adhesion can be produced between the damaged finishing coat and the new colour-bearing base coat the former must first of all be completely sanded down.

After this sanding down the car is then fed back into the production workflow to be painted afresh. Sanding is not only any extremely costly process it is also an uncertain process because a great deal of dust is produced in this work. This cannot always be removed 100 per cent even by complex suction systems.

Improved paint adhesion

By using atmospheric-pressure plasma the whole problem of

ACTIVATION, CLEANING OR LAYER DEPOSITION BY MEANS OF PLASMA

The atmospheric-pressure plasma technology (Openair) developed by Plasmamatreat is based on a jet principle. In contrast with costly low-pressure plasma systems (vacuum chamber) the jets here operate in-line at atmospheric pressure, that is to say under normal atmospheric conditions. They are operated solely by air and high voltage.

The emergent plasma beam is electrically neutral which greatly extends and simplifies its applicability. Its intensity is so high that treatment speeds of several 100 m/min can be achieved. Typical rises in temperature of plastic surfaces during treatment here amount to $\Delta T < 20$ °C.

The system is characterised by a threefold action: it activates the surface by selective oxidation processes, discharges it at the same time and brings about microfine cleaning of the surfaces of metals, plastics, ceramics and glass. In addition the plasma energy of this system is used for layer deposition. By adding a precursor the technology has been further developed for nanocoating.

dust when repainting a car body can be avoided. In the process damaged areas are first of all selectively repaired. After this the entire finishing coat is pretreated with plasma which renders the otherwise necessary sanding of the protective layer superfluous and any generation of dust is prevented.

With the aid of four to six handling robots the whole process lasts no longer than about 10 minutes. After this the car body with its microclean and highly activated finishing coat surface can be channelled in a very short time back into production for repainting.

A well known car manufacturer has already started a corresponding large-scale series of tests using the new process. In doing so it turned out that this atmospheric-pressure plasma process not only operates more efficiently than the conventional sanding process but also that due primarily to the plasma treatment the adhesion between the new base coat and the "old" finishing coat is even improved in comparison with sanding.

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