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Cleaning and activation combined in one pass

Cutting rejects by ultrafine cleaning with plasma technology

Nowadays the visual impression made by a high-grade consumer product often determines the decision to buy or not to buy. A perfect finish, however, requires particularly good pretreatment prior to painting. “Openair” atmospheric-pressure plasma from Plasmatreat ensures ultrafine precleaning and high activation of surfaces.

Automotive engineering imposes high demands on painted surfaces. Pretreatment with atmospheric-pressure plasma ensures an immaculate visual appearance.
Source (both pictures): Plasmatreat

The more technologies conform to one another the more important visual appearance becomes in the purchase decision. Design elements and flawless surfaces ever more frequently form the distinguishing criterion. A decisive factor in all of this is the best possible precleaning and activation of the surfaces to be treated. Despite the often high cost the proportion of rejects in production caused by painting over dust particles is usually more than 10 %. Static charging of surfaces, slight residues of fine dust in more inaccessible areas or environmental pollution are the most common problems.

With the “Openair” atmospheric-pressure plasma technology developed by Plasmatreat in Steinhagen a process has now been devised whose use can cut rejects considerably. The technology effects ultrafine cleaning and high activation of different surfaces and brings about good adhesion of paints.

A large American vehicle manufacturer has benefited from this technology for more than three years in the pretreatment of plastic surfaces. High demand for its vehicles combined with the very highest requirements on a multilayer painted finish caused bottlenecks in the stoving ovens.
A vehicle part usually has to pass through many stations during the painting process. A typical plastic component is given a priming coating, up to eight layers of paint and then the final clear lacquer finish. Stoving ovens, however, have limited capacity and most manufacturers have only one painting line and one stoving oven per factory. Accordingly, a workpiece here passes through the same oven four to nine times. Any opportunity of increasing throughput capacities without capital investment

gives rise to significant cost savings.

Following injection moulding and prior to painting instrument panel module housings are first of all cleaned by plasma.

Considerable increase in throughput

In the painting process even a reduction of just one pass eliminates the costs of the primer and the associated staffing costs and also reduces the fixed costs of the stoving oven.

In certain vehicles, however, it is not possible to reduce the number of decorative coats of paint and still retain the same visual appearance of the surface. But with the aid of atmospheric-pressure plasma treatment it is possible even in this case to dispense completely with the primer coating. This results in 25 % fewer passes through the stoving oven and hence in a major increase in oven capacity.

Other pretreatment processes considered by manufacturers, such as corona or flame treatment, were dropped on grounds of the conductivity of the parts, the possibility of thermal damage and on safety grounds. When atmospheric-pressure plasma is used these risks are ruled out completely.

Switches with laser-etched symbols, high-gloss ornamental strips and covers, scratch-resistant painted display areas and sparkling fascias, ventilator grills or glove compartments – even plastic parts in car interiors – are now provided with costly coats of paint. Plasma technology can be employed as a pretreatment process both for the adhesive bonding as well as for the painting of these subassemblies as is done, for example, in the case of vehicles made by BMW and Rolls Royce.

There are scarcely any limits to the diversity of applications of this method of pretreatment in the painting process. Additional significant advantages include the reliability and quality of the method in the production process. In this way high expectations can be met. Furthermore, requirements such as ease of integration into process workflows and compatibility with cathodic dip coating of the treated surfaces are met just as well as those for economic efficiency in comparison with conventional methods. □

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