

## Better quality in less time

The first fully automated plasma station for pretreating different profile geometries

**TREATMENT AND PROCESSING — nowadays high-grade production processes are increasingly reliant on advanced technologies for the pretreatment of material surfaces. The aim of any such pretreatment is to produce extremely clean, highly activated surfaces with reliable and reproducible characteristics in order to ensure optimum coating and bonding. This topic has become increasingly relevant to seals and profiles in recent years.**

It would be impossible to apply a durable painted, flocked or bonded finish to the millions of meters of EPDM or TPE seal profiles used in the automotive industry each year without activation, i.e. additional surface modification. This is due to the low surface energy of these composite plastics and their correspondingly low adhesive characteristics. Conventional pretreatments such as keying the profile with rotating brushes or spraying on solvent-based primers to act as adhesion promoters for subsequent painting processes are becoming increasingly sidelined: The first method is inaccurate, fairly unreliable and generates a great deal of dirt; the second method is harmful to the

environment and associated with high disposal costs. Furthermore, neither process is exactly reproducible or secure.

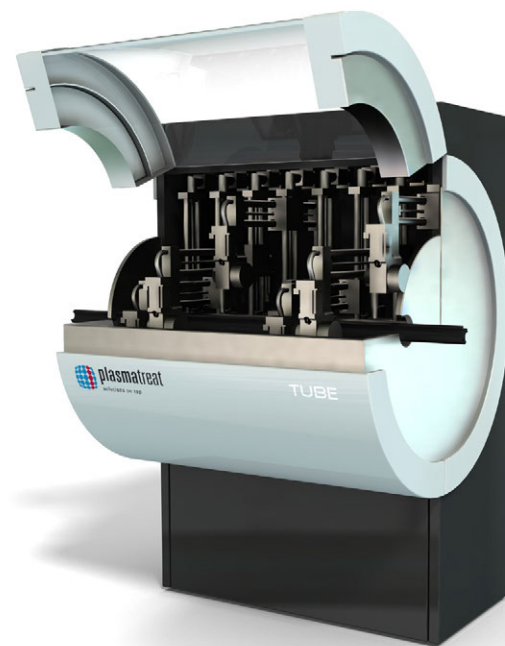
### Pretreatment with atmospheric pressure plasma

Pretreatment with atmospheric pressure plasma is an alternative to these traditional methods and their associated problems »1. This solution has been available for industrial use for 20 years through the development of in-line nozzle technology (Openair plasma). Today plasma technology is used throughout the world in almost every branch of industry. The German company Hutchinson GmbH has been employing this environmentally friendly and reliable method to pretreat EPDM sealing tape for the automotive industry since the late nineties. At Hutchinson, around 100 different types of profile with varying geometries — amounting to over 20 million continuous seals per year — undergo ultrafine cleaning and activation. The plasma treatment ensures the long-time stable adhesion of subsequent water-based painting or flocking processes.

The microfine cleaning and simultaneous activation of seals, hoses or profiles is always locally selective and achieved in seconds, in-line and under normal atmospheric conditions. The process is environmentally friendly, needing only compressed air and electricity.

### The next generation

The sheer diversity in automotive manufacturing combined with the increasing demand for shorter manufacturing cycles before the next model change means that the variety of profiles to be manufactured is constantly rising. Plasmatreat was faced with the question of how to reduce profile changeover times as well as maintenance and service interruptions in an effort to make the already very rapid plasma pretreatment process even more efficient when manufacturing a wide variety of different seal profiles. This resulted in the development of PlasmaTube, the world's first fully automated plasma station for pretreating door seal profiles »2. This system can accommodate between four and twelve plasma nozzles. By selecting a predetermined



»2 The PlasmaTube fully automated EPDM plasma station can pretreat over one thousand different profiles

»1 Replaces brushes and primers: Openair-Plasma technology simultaneously brings about the microfine cleaning and strong surface activation of EPDM profiles in a split-second and environmentally friendly process

nozzle configuration in relation to the profile, nozzle repositioning is completed in a minimum of time. During a profile change the unit automatically adjusts the axes to the new nozzle position in less than a minute – using the integrated control system for optimum precision and reproducibility. The unit can memorize up to 1024 different profile settings which can be retrieved at random. As well as automatic nozzle placement, the system also features an intelligent nozzle preselect function which ensures that only those nozzles that are actually required are supplied to the treatment chamber; the remaining nozzles are left outside. It can also reliably detect nozzle failures. The fully automated treatment station also incorporates a suction system located in the center of the unit beneath the profile. This prevents additives carried in the plasma from condensing on the walls of the unit, thereby extending cleaning cycles performed as part of the maintenance regime. Furthermore, the curved inspection window aligned with the profile center makes it is easy to check the nozzle position in relation to the profile.

### Summary

The new system will be of particular benefit to manufacturers with frequently changing profiles and small batch numbers. Operating with minimum staffing levels and ensuring absolute reproducibility of the activation process, the fully automated EPD pretreatment system delivers quality assurance and reduced cost. Especially for manufacturers with only a small number of profile formats, the system offers a high level of reliability in the pretreatment process by eliminating changeover errors from the outset.

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### FACTS FOR DESIGN ENGINEERS

- Plasma surface treatment enables seal profiles to be adapted to increasingly tough requirements

### FACTS FOR PURCHASERS

- A reduction in changeover, maintenance and service times, operating costs and reject rates leads to greater efficiency and increases production output

### FACTS FOR QUALITY MANAGERS

- Fully automated system for greater process reliability and higher quality
- High process reliability
- Integrated monitoring and control with data transfer