

TECHNOLOGY

Cutting CO₂ emissions in the automotive paintshop

How to make paintshop operations more sustainable

The use of the Robot Sword Brush 'Laura' for cleaning car bodies in the paintshop improves first time quality while at the same time simplifying paintshop operations, according to manufacturer Wandres. The company claims that users are frequently able to dispense with the drying stage after seam sealing thereby reducing energy use drastically and cutting carbon emissions.

After immersion in the electrocoat tank, a PVC-based, paste-like sealing material is applied to weld seams and body panel creases. Seam sealing of the bodywork is important as it guards against crevice corrosion and prevents moisture penetrating. At the same time it provides protection from stone chipping and abrasion. The wet PVC is tacky and will usually be hardened in a dryer before entry to the primer line. The dryer is a curing oven of about 100m in length that heats the bodyshell up to temperatures of between 120 to 130 °C. This requires an enormous amount of energy and, accordingly, is responsible for the release of large quantities of greenhouse gas emissions.

Dispensing with the dryer

Deploying Robot Sword Brushes means the facility can forego an entire drying step after seam sealing. Robot Sword Brushes follow the lines of the bodyshell with high accuracy. Consequently, the polyamide brush filaments will never actually come into contact with the freshly applied and still sticky seam sealing. For this reason, the sealant no longer requires drying before the cleaning process can go ahead. It

is quite sufficient if the sealing material is baked in the primer oven in a subsequent step. This innovative cleaning technology can easily be integrated into existing paintshops. The flange of the Robot Sword Brush is designed to be compatible with all standard robotic systems and is equipped with a quick change system. Planning with Robot Sword Brushes in the early stages of a new project development brings clear advantages as the

primer line will take up considerably less space without the dryer.

In addition, savings are made on the high investment costs for the dryer, the painting process is simplified significantly and substantial reductions in energy consumption can be realised. Even without considering escalating energy cost increases, this could mean cost savings in the mid-six-digit range over the course of a year alone.

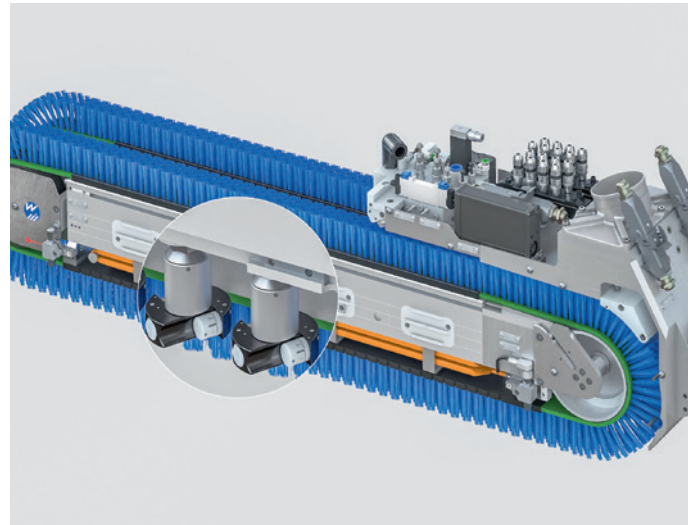


A bodyshell is cleaned and the procedure tested in the Wandres Technology Centre.

Images: Wandres GmbH



The brush filaments follow the geometry of the vehicle precisely without ever touching the wet seam sealing.



Cleaning with air technology - a line of rotating Tornado Nozzles installed between twin linear brushes.

Air technology and brush cleaning technology combined

Wandres claims the investment in a cleaning system with Robot Sword Brushes has a payback period of merely a few months in most paintshops. Particularly in the context of the fast cycle times of the modern paintshop, a combination of air technology and brush cleaning technology will guarantee optimal cleaning results and a surface finish of the highest quality. In an initial phase, roof seams, recessed grips and any other recesses in the surface of the bodyshell are targeted for cleaning using air technology. This is followed by a precision cleaning process performed by linear brushes. Twin linear brushes circulating in parallel clean the surface of the bodyshell with lightly moistened brush filaments. Micro-moistening of the filaments with the anti-static

cleaning agent 'Ingromat' causes even ultra-fine particles to be absorbed while the surface still remains dry. The particles captured are swept towards a self-cleaning unit where they are mechanically detached from the filaments and propelled towards a suction system.

Thanks to this self-cleaning function, the linear brushes are ideally equipped to run in 24-hour operations in industrial production. The dual linear brushes are positioned in parallel and driven by a direct-drive motor embedded within. The two circulating linear brushes have a flexibly mounted working run as they are bedded on a pneumatically regulated flexible buffer.

Flexible linear brushes and rotating Tornado Nozzles

The linear brushes adapt perfectly

to both concave and convex curved surfaces. The deviation tolerance of the linear brush at the centre of the flexible contact area is -30 to +10 mm relative to the surface plane. According to the manufacturer the linear brushes have an ultralong service life despite being used in demanding applications and harsh environments in industrial production. The brushes are manufactured to meet the most stringent quality standards by sister company Wandres Brush-Hitec GmbH in the South of the Black Forest. The brush filaments are made of polyamide and engineered with rounded filament tips to protect particularly delicate surfaces. The Robot Sword Brush 'Laura' features 11 rotating Tornado Nozzles Type Janus' installed in a line between the twin linear brushes. The angle of the air jet is

variable while the aperture diameter of the nozzles can be adjusted tool-free to achieve the best possible cleaning results. Tornado Nozzles expel compressed air at several times the speed of sound. The compressed air powerfully removes particles and dust from recessed areas on the surface of the bodyshell in a high-performance and contactless cleaning procedure.

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