

Efficient and effective cleaning of body shells at fast cycle times

A newly developed Robot Sword Brush combines brush cleaning with air technology. The system is already deployed on numerous paint lines and ensures a high level of process stability.

Just the smallest particle of dirt can cause visible flaws during top coat application. Re-work issues and rejects cost the automotive industry billions every year. A reliable cleaning system is the key factor in delivering a stable and economical production process at fast cycle times in a modern paint shop. A wide range of different cleaning systems are available for manufacturers and integrators to select from. In recent years, major automotive manufacturers have opted for the Sword

Brush Technology developed by Wandres, based on the consistent and high performance cleaning results that are guaranteed in 24/7 production (see article in JOT 4|2018, pages 134-137).

Twice the area coverage and a compact footprint

The newly developed Robot Sword Brush Laura 160 offers twice the area coverage compared to the previous model and

additionally features rotating nozzles emitting compressed air to precisely target recessed areas in a preliminary cleaning action (Fig. 2). Thanks to a direct-drive motor which is embedded within and a slim, smooth silhouette, the machine is extremely compact and can be deployed on either side of the track. As an added bonus, Laura 160 can handle the cleaning of add-on parts in parallel if these are loaded onto the same skid as the vehicle bodies.



Fig. 1 > Automotive manufacturers can have cleaning systems tested on their own body shells at the Technology Centre in Wagensteig.

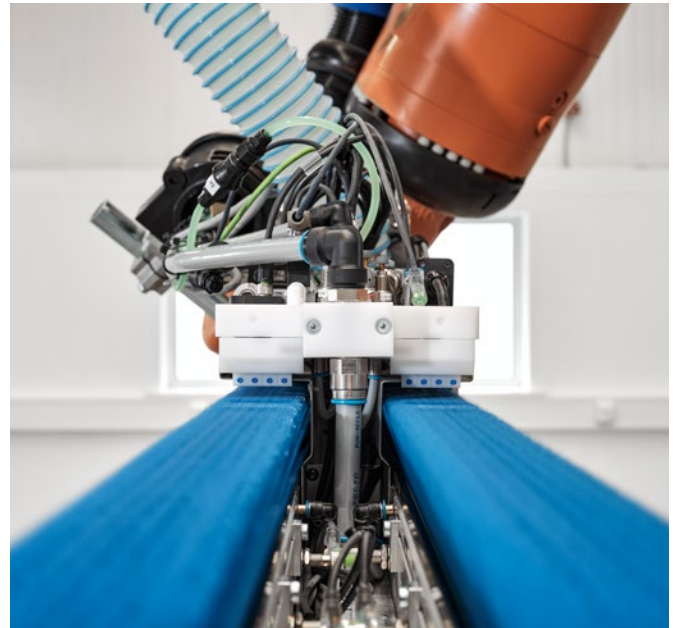
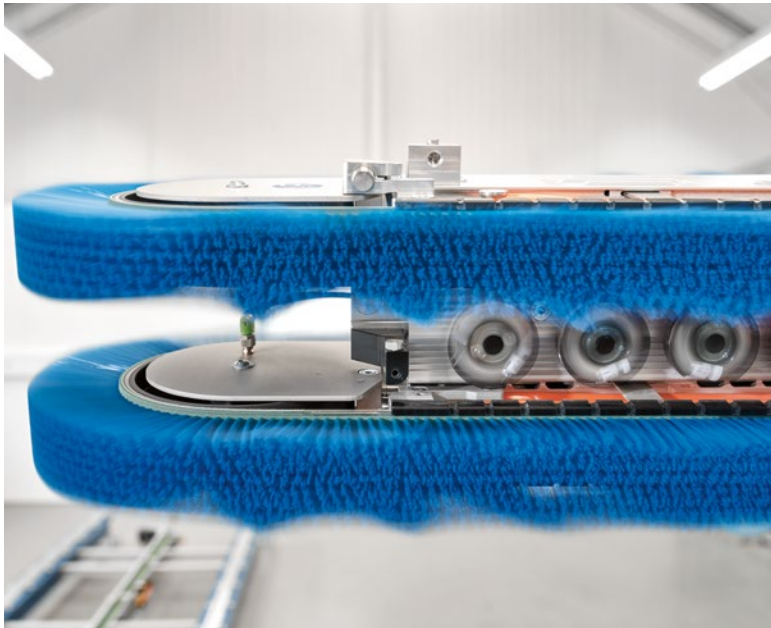


Fig. 2 > The new Robot Sword Brush combines air technology (left: rotating Tornado Nozzles) with brush cleaning technology (right: micro-moistened linear brushes).

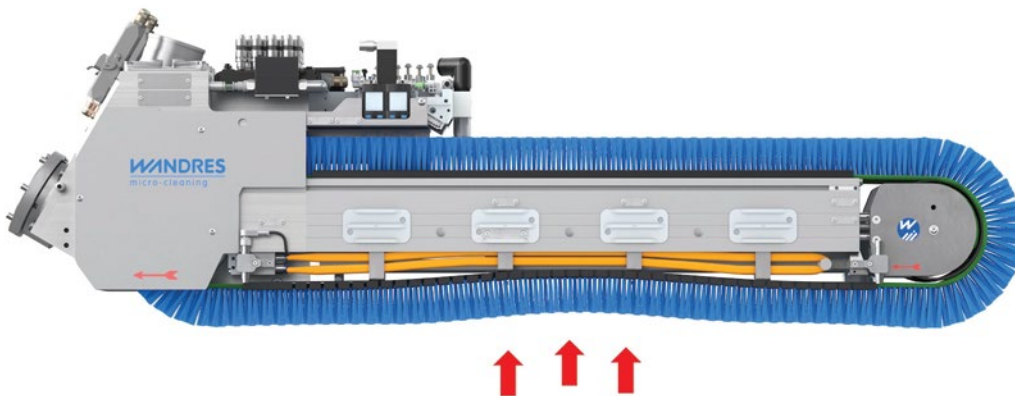


Fig. 3 > A flexible buffer allows the linear brush to adapt flexibly to the area of contact, thereby ensuring convex and concave surfaces are cleaned perfectly.

Cleaning complex geometrical shapes

The new Robot Sword Brush is equipped with two belts fitted with filaments made of polyamide. These linear brushes circulate around a sword-shaped guiding element. The twin linear brushes are each mounted on a pneumatically regulated flexible buffer. The brushes have a deviation tolerance of - 30 mm to +10 mm at the centre of the flexible contact area and can therefore adapt perfectly to convex and concave curved surfaces (Fig. 3).

Stability for continuous operations

The brush filaments are lightly moistened with Ingromat antistatic cleaning agent.

Micro-moistening causes even ultrafine particles to cling to the brush filaments while the surface remains dry and can be coated immediately. Particles are detached from the filaments in a self-cleaning unit by an adjustable rack system and disposed of by vacuum extraction. This procedure guarantees consistent and high-performance cleaning results in 24/7 operation (Fig. 4).

Targeted cleaning using air technology

Rotating nozzles expelling compressed air are fitted in a line between the twin linear brushes. The aperture of the Tornado Nozzle Janus 50 D is adjustable in diameter and the discharge angle of the nozzle can also be altered as required. This achieves

the maximum effect while usage of compressed air is kept to a minimum. Thanks to the Tornado Nozzles, recessed areas such as roof seams and recesses for grips can be specifically targeted for cleaning. To deliver the best possible cleaning results, particles are initially removed from recessed areas using air technology while brush cleaning follows up with precision cleaning of the body shell.

Accurate robot guidance ensures the lines of the vehicle body shell are followed precisely. The Robot Sword Brush covers the length of freshly applied and tacky PVC seam sealing exactly and without the brush filaments ever coming into contact with the PVC seam. Tornado Nozzles, however, clean the entire area of the PVC seam using compressed air in a contactless cleaning process.

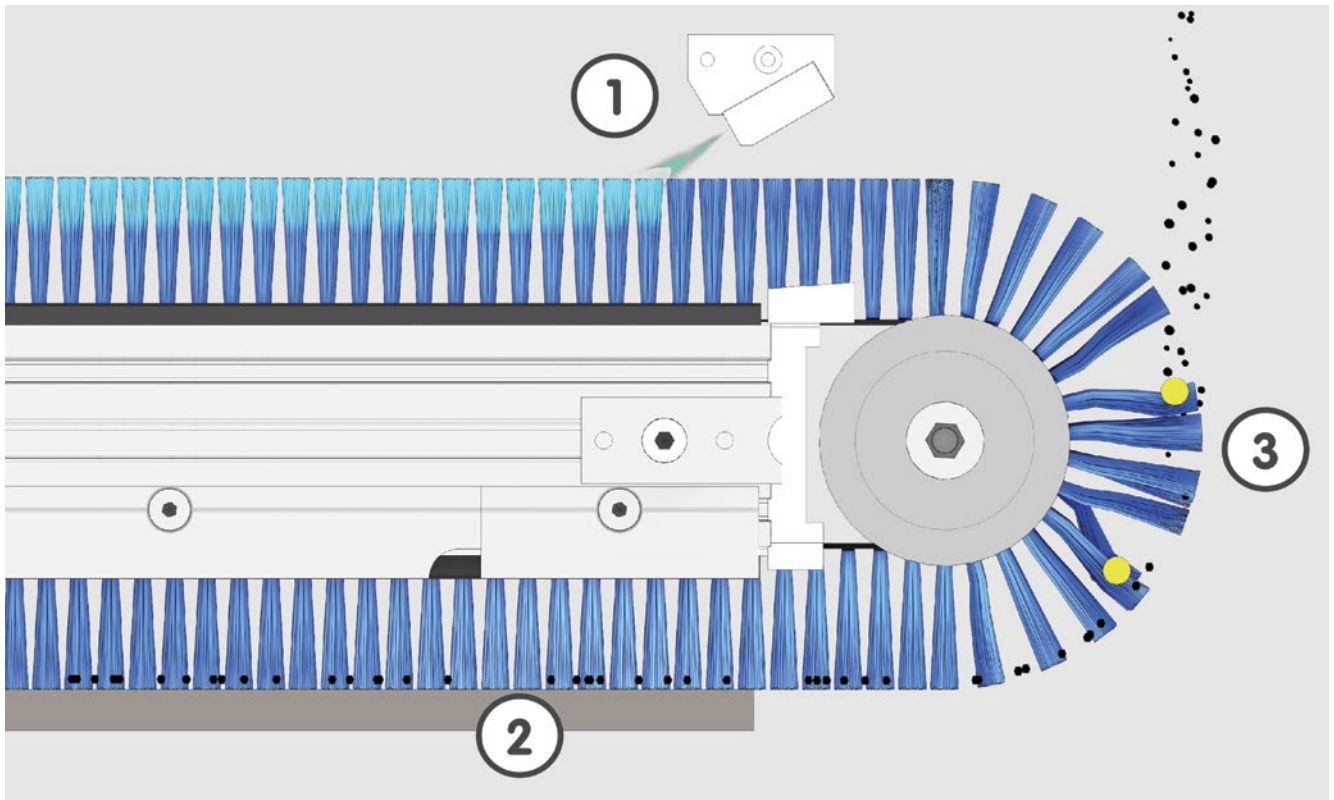


Fig. 4 > The cleaning process consists of three steps: 1. Micro-moistening of the filaments, 2. Cleaning of the surface, 3. Self-cleaning and vacuum extraction.

Testing in real-world conditions

The availability of a 6-axis robot complete with positioning track at the Wandres Technology Centre in Wagensteig, on the fringe of the Black Forest, means cleaning systems can be tested on body shells or other sample parts in close to real-world conditions (Fig. 1). In the early planning

stages of a new cleaning system at a paint shop, a sample body shell can be dispatched to Wagensteig in advance. Cleaning trials can then be conducted on site at various speeds to define the key parameters required to secure optimal cleaning results.

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