

# Effective surface cleaning for car windows, flat glass and solar glass panels

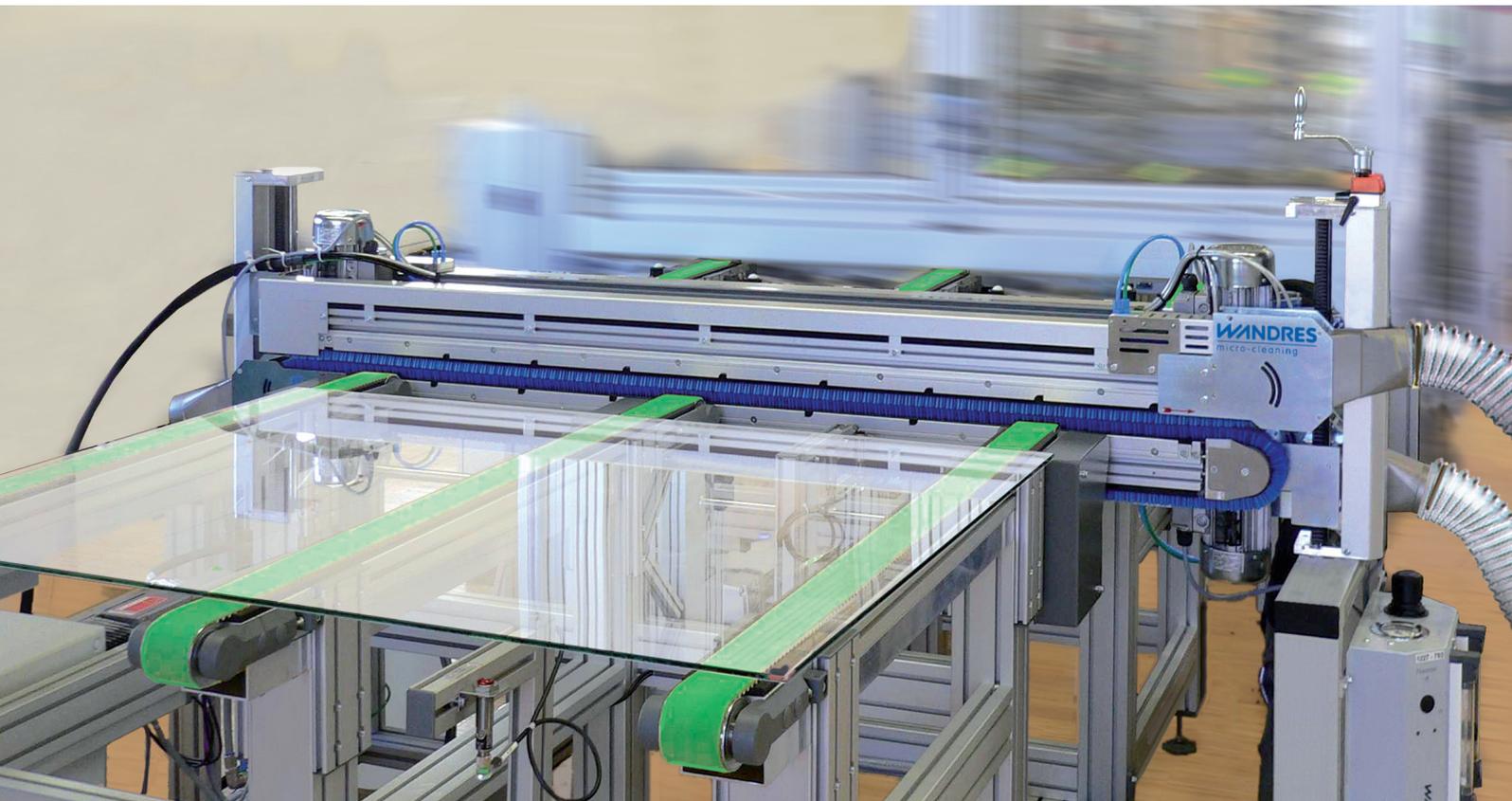
Combi Sword Brushes for the glass industry



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**WANDRES**  
micro-cleaning



Cleaning of flat glass before video inspection

## Innovative cleaning technology guarantees clean product surfaces

Clean surfaces are a must for the production of high-quality glass products. Particles and dust on surfaces lead to a wide range of production problems and quality related losses. Effective cleaning of flat glass, solar glass or bent glass is therefore increasingly becoming an important step in the overall production process.

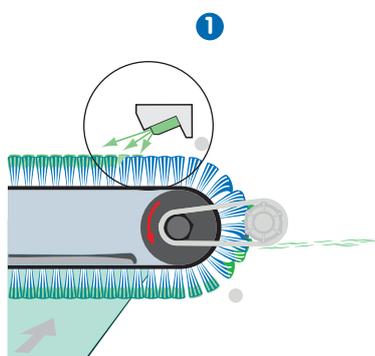
### Typically, surface cleaning is performed

- before washing machines to remove separating powders
- after scoring to remove glass chips
- before coating to eliminate imperfections
- after grinding to remove particles
- before camera inspection to reduce false positives
- before screen printing for defect-free print results

A number of other processes require subsequent surface cleaning, for instance CNC machining, drilling, sanding, sandblast matting or bevelling.

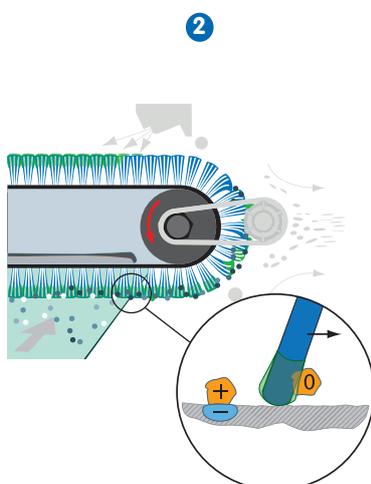
Wandres GmbH micro-cleaning develops and produces innovative brush- and contactless cleaning systems for industrial productions. The medium-sized company has been specializing in the gentle and effective removal of dust, fibres and minute particles from product surfaces for more than 35 years. A sophisticated modular system allows individual adaptation of Sword Brush modules to the respective production line and to the specific production conditions. The Sword Brushes wipe crosswise to the transport direction and are available for working widths from 400 mm to > 3000 mm (15" to > 115"). The brush cleaning modules may be combined with contactless cleaning modules.

## Ingromat® system provides for optimal results



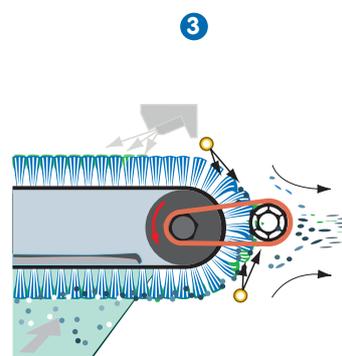
### Micro-moistening of the linear brush with Ingromat®

The Ingromat® sprayer applies a thin film of Ingromat® antistatic cleaning liquid onto the filament tips. Ingromat® is food safe and compliant to FDA. It reduces static charges while the surface remains dry.



### Cleaning of the product surface

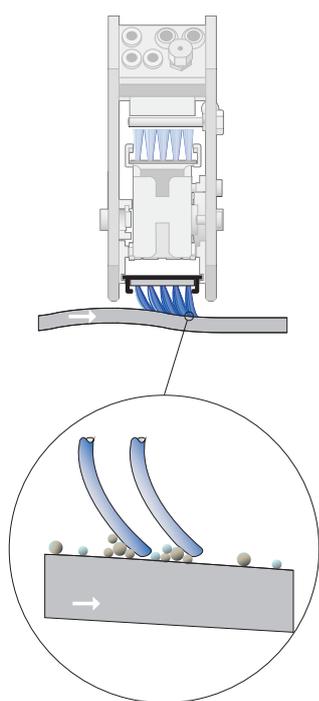
The linear brush wipes transversally across the surface. It binds particles to its micro-moistened filaments by means of capillary attraction, transporting them safely towards the suction system.



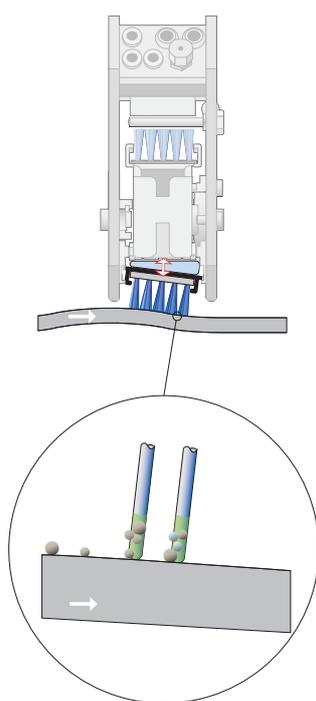
### Self-cleaning mechanism of the linear brush

A rotating rack and compressed air nozzles provide for a constant cleaning mechanism of the filaments so that they can continue to absorb new particles.

## Pressure buffer exerts constant wiping pressure



Without pressure buffer



With pressure buffer

### Flexible bedding of linear brush

An integrated pressure buffer allows a flexible bedding of the contact area of the linear brush. The pressure buffer is regulated via compressed air and will exert a constant wiping pressure onto the surface. Filaments thus pass the surface in a vertical position ensuring optimal cleaning results. The pressure buffer compensates small height differences.

For the cleaning of convex glass, for instance glass windscreens, we have the Combi Sword Brush Una GV., which works without pressure buffer. Instead, the circulating linear brushes are mounted on flexible guides and optimally adapt to the glass contours via several actuators.

## Proven technology and reliability – Wandres convinces with practical solutions

### Cleaning after destacking

Separating powders that adhere to the upper and lower glass surfaces clog the filters of washing machines. Sword Brushes effectively remove these separating powders from the glass surfaces after destacking at a reasonable price. This will considerably relieve subsequent washing processes.

In some cases, washing machines may no longer be required. Operating costs will thus be reduced substantially. A sophisticated modular system permits an individual adaptation of the Sword Brushes. The machines can easily be integrated into existing production lines.



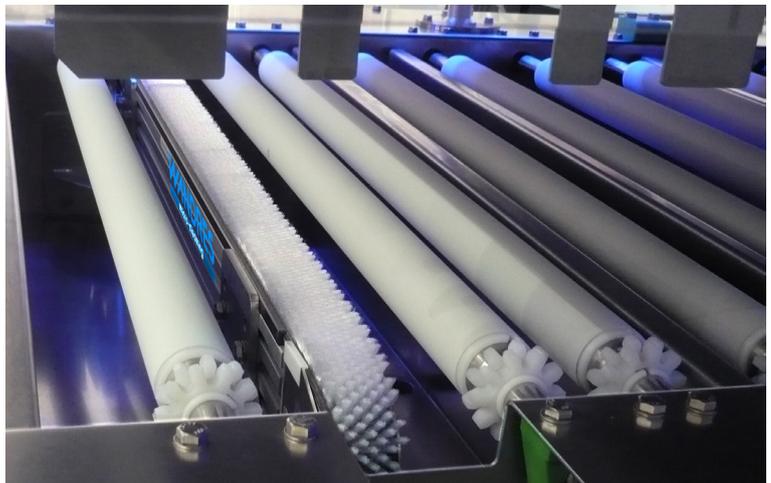
### Cleaning after scoring or grinding

For wet cleaning applications, we recommend the Sword Brush Aqua, which is made of stainless steel. It cleans glass surfaces for instance after scoring or grinding processes. The brush filaments reliably eliminate glass chips and the mixture of small glass particles and water leaving a clean surface. This conserves the filters of subsequent washing machines. Maintenance and down times of washing machines will be considerably reduced. Cleaning with Sword Brushes is a cost efficient alternative to the usual pre-cleaning within an immersion bath. Additionally, the wiping movement of the brushes begins to dry the surface.



### Wet cleaning within washing machines

The Sword Brush Aqua.. may also be used as an efficient alternative to round brushes within washing machines. Unlike round brushes, the Sword Brush Aqua does not hurl contaminating debris onto surfaces that have already been cleaned. If used as a pre-drying device at the end of washing processes, the Sword Brush will reduce the expensive drying process. Surface cleaning with Combi Sword Brushes is a reliable and energy-efficient technology with low operating costs.





### Cleaning before coating or printing

Particle inclusions can be avoided if glass panels are cleaned by Sword Brushes before coating, bonding or printing. The patented Ingromat® system provides for the effective removal of the finest particles. Moreover, Ingromat® reduces electrostatic charges whereas the surface tension improves.

During the cleaning process, the subject surface will remain dry. Subsequent coating, bonding or printing processes may be carried out immediately.



### Cleaning of car windows

For inline cleaning of bent glass panels such as lateral car windows, Wandres has developed the Combi Sword Brush BIG... The circulating linear brushes are mounted on flexible guides and optimally adapt to the glass contours via several actuators. The automatic inline cleaning of automobile glass before video inspection avoids particle-related false positives. As a consequence, rejection rates are drastically reduced which saves costs and increases productivity.



## Experienced and successful - Wandres stands for quality



Design, 3D-CAD engineering



Production facility with modern CNC machines



Pre-assembly under cleanroom conditions



Final assembly

## Wandres GmbH micro-cleaning

Since its foundation in 1981, Wandres GmbH micro-cleaning has been designing and producing reliable and low maintenance cleaning systems for continuous industrial productions. Customers come from all over the world and include both large corporations and solid medium-sized companies from the furniture, packing, automobile, electronic, glass, paper and printing industry sectors.



Cleaning of cardboard, paper or foil webs



Cleaning of flat materials e.g. boards, panels, blanks, flat glass



Cleaning of three-dimensional surfaces with robots e.g. car bodies

### Quality and efficiency

More than 100 motivated employees, modern production technology, a high level of vertical manufacturing and complex inspection routines provide for high quality results. Wandres convinces with its high-value products for continuous production processes. The Wandres machines are subject to very harsh production conditions, enjoy long industrial lives and are highly efficient.

### Global connections

- Wandres GmbH micro-cleaning: Headquarters since 1981 in Buchenbach-Wagensteig near Freiburg in the Black Forest (Germany). Research and development, technical centre for tests under cleanroom conditions, in-house manufacturing of parts requiring specialist expertise, assembly, service, quality control.
- Wandres Brush-Hitec GmbH: Development and production of linear brushes and Ingromat®. Since 2004.
- Wandres Corporation: Mounting and distribution of cleaning systems in the American market. Since 1998.
- Wandres Cleaning Machinery (Shanghai) Co., Ltd. 2015: Establishment of a local subsidiary in China

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