

One of the most cutting-edge body presses worldwide went into operation at the Daimler plant in Kuppenheim in 2016. The six-stage XL servo press with a total pressing force of 9,100 tonnes forms outer skin components such as side walls, bonnets and doors for compact vehicles from Mercedes-Benz. Particle-free surfaces are crucial to the stamping of outer skin components and Daimler depends on the Sword Brush technology developed by Wandres to meet these stringent requirements both in their laser blanking lines as well as in the press lines. The laser cut sheet-metal blanks as well as body outer skin components are supplied to Mercedes-Benz factories in Rastatt and Sindelfingen for body shell construction in passenger car production and to the truck assembly plant in Wörth for the production of cabs.



XL servo press in the Mercedes-Benz plant in Kuppenheim (Image: Mercedes-Benz)

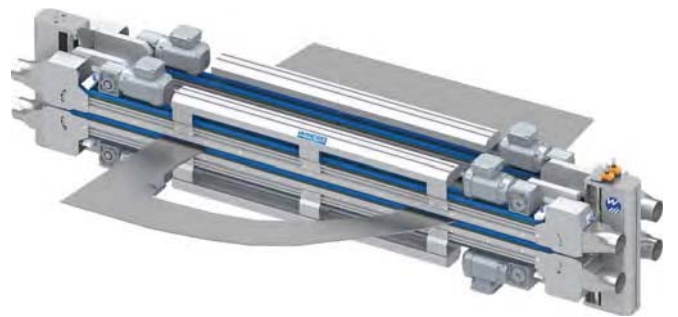
Brushes replace washers

Brush cleaning systems developed by Wandres Micro-Cleaning have been deployed in the industrial processing of sheet metal for around 20 years now. The linear brushes wipe transversely across the surface of the metal blanks or coil. The filaments of the brushes detach contaminating particles from the surface, binding and disposing of them effectively. The brush filaments have been optimised for the cleaning of metal surfaces and display excellent abrasion resistance, enabling the circulating brushes to withstand repeated contact with the sharp edges of the sheet metal.

The Mercedes-Benz press shop in Bremen was the first site to adapt the servo press line to incorporate blank cleaning using Sword Brush technology back in 2012. The resulting, flawlessly clean surfaces and homogenous lubrication have proved impressive. Based on a track record of reliability and performance over the course of several years, the newly acquired press line, in use at the press shop in Kuppenheim since the end of 2015, has also been equipped with a cleaning machine type Evomat. This cleaning machine cleans blank widths up to a maximum of to 4,300 mm and lengths of up to 2,000 mm. The

minimal width and length of blanks is 400 mm.

The Evomat Cleaner cleans the blanks from above and from below with two brushes wiping the upper surface and two wiping the lower surface. The single or double aluminium and steel blanks, either identical or individually shaped, are transported through the cleaning module at a speed of 180 m/min before entering the press line with the lube evenly distributed ready for forming.



Sword Brush module cleans metal blanks after laser cutting (Image: Wandres)

Pre-cut metal blanks as well as tailored blanks of varying thickness can be safely transported through the cleaning process side by side as an integrated pressure buffer compensates for differences of up to 1,5 mm. If thicker materials are being processed, the upper pair of brushes may be adjusted in their vertical position to accommodate a new blank thickness.

In the robot press line at the Daimler-Benz facility in Kuppenheim, a Sword Brush module also replaced the blank washer in January 2016. This proved possible thanks to the space-saving design of the Evomat which has a compact footprint of around 600 mm and thus easily accommodated in the available space of 1,630 mm. The distance between the feed belt and the cleaning unit was bridged using an additional roller conveyor. The cleaning machine was installed at the weekend, easily integrated into the existing press line and coordinated simultaneously with the overall line control system.

A perfect combination: laser and brushes

Sword Brushes have also proved ideal for delivering spotlessly clean surfaces in two laser blanking lines prior to the forming process. Finished blanks require a high-quality cleaning process following laser blanking, as particle contamination can cause havoc with surface-sensitive materials during downstream stacking and forming. This task is performed effectively once again in both laser blanking lines by Sword Brushes which have been designed specifically for this particular cutting process in cooperation with Schuler, the manufacturer of the laser blanking lines.

The key requirement of this cleaning application is to remove the extremely fine dust generated by laser blanking from the surface of the lubricated blanks. Located together with the laser blanking heads, high performance suction systems positioned immediately below the cutting line extract most of the dust particles. Any extremely minute, loose dust particles still present after this process are further eliminated by Sword Brush cleaning. Binding the particles to the filaments, the brushes unavoidably also absorb the oil bound to the particles. This mixture of oil and dust particles is detached from the filaments at the deviation of each linear brush by the self-cleaning mecha-

nism of the Sword Brushes. A thick and highly viscous mass is deposited on the sides of the suction channel and the connections to the vacuum extraction unit. This mixture of particles and oil is systematically thermally separated from these surfaces so it can be eliminated via a cyclone separator. The self-cleaning mechanism of the linear brushes regenerates the brush filaments so that they can continue to absorb new dust particles.

Two pairs of brushes for each side

To achieve optimal cleaning results with blanks of varying widths, each blank is cleaned both from above and from below, with two double brushes wiping in opposite directions on each side. The filaments of all eight linear brushes are lifted shortly before reaching the edge of the blank to avoid detaching any burr remaining from coil production. A flexible positioning of the Sword Brushes ensures that the linear brush pairs can always be adjusted to the width of the laser-cut blank and that, despite the offset operation, the entire width of the material is cleaned from the centre to the edges.

The time elapsing before the arrival of the next blank is used to clean the conveyor belt of the stacking line. This ensures that any particles present there will be eliminated and any last remaining droplets of oil disposed of, thus avoiding undesirable marks on the surface of the blanks.

The blanks processed at these laser blanking lines are considered to be of superior quality, not only at the site itself, but also at the Daimler facilities which are supplied by the Kuppenheim plant with body components for vehicle construction. Such positive feedback proves that the intensive collaboration between the research and development departments of the suppliers in close consultation with the project team at Daimler has paid off.

Sword Brushes

Wandres Micro-Cleaning, www.wandres.com