

COMPACT SOLVENT SYSTEM FOR CAR COMPONENTS

Precision cleaning in a full vacuum

A company based in Saxony which supplies parts to the automotive industry needed a powerful and reliable new cleaning system. The machine had to be efficient because of the particularly high levels of cleanliness required by customers from the automotive industry. Reliability was equally important, as a fault in the parts cleaning system would lead to a complete shutdown of production. The new compact solvent cleaning machine meets all these requirements.

____ The core business at Ibox involves post-machining cold-extruded components made from steel or stainless steel. In contrast to conventional machining processes, this solution uses much less material, takes less time and is often significantly more cost-effective. The production programme consists of a range of parts for the automotive industry, including all the components of an elec-

tric parking brake for a well-known car manufacturer.

When the company's managers began planning the new production site, they realised that a powerful, reliable parts cleaning machine was needed. In contrast to the multiple machining systems, the company's entire production passes through one cleaning machine and therefore a fault in the parts cleaning

system would result in production being shut down throughout the company.

As the cleaning process is the last stage of production before quality control, the cleanliness requirements are primarily specified by the end customers.

The parts must have no impact points or other surface damage, the residues of cutting oil and swarf must be completely removed (surface tension of at least 38



In the new automatic machine the parts undergo a thorough cleaning and anti-corrosion process. However, in continuous operation the machine runs on only a 10-minute cycle.

Figures: Höckh

mN/m required) and, finally, the steel components must be protected using a specific anti-corrosion treatment. The particle cleanliness requirements are also defined by the individual end customers. In order to make the parts handling process simpler and to give the parts the best possible protection, product-specific cleaning pallets have been developed in collaboration with Metallform.

Cleaning machine configured to meet specific requirements

The Multiclean-2-5-F machine supplied by Höckh in December 2007 is based on the Multiclean-F range and is designed to clean parts with solvents in a full vacuum. However, it was also equipped with a range of options to meet the company's specific requirements.

The operator places a stack of pallets on the loading area of the fully automatic roller conveyor and chooses the appropriate cleaning programme. The programme can also be selected using a barcode scanner. The cleaning chamber, which can accommodate a maximum batch size of 670 x 480 x 300 mm and a maximum weight of 100 kg, is loaded automatically. After the glass doors have closed, a leak test is carried out and the pressure in the chamber is lowered to system pressure. The parts are then cleaned using perchloroethylene in a process consisting of up to five stages, depending on the programme.

The first stage is a spray pre-rinse using solvent from the first feeder tank. The oil which is removed during this stage is pumped directly to the distillation unit. This prevents the feeder tank



A stack of pallets in front of the automatic loading area.



The glass doors allow the cleaning and drying processes to be carefully monitored and adjusted.

from being contaminated by an excessive amount of oil. The next two stages involve immersion cleaning combined with high-pressure flood washing and/or ultrasound. In addition, stainless steel parts are subjected to a vapour degreasing process with high-purity solvent vapour. Steel parts undergo a further anti-corrosion treatment using an injection flooding process, before being rapidly and completely dried in a vacuum. A concentration measurement device monitors the drying process and allows the parts to be removed as soon as the air in the chamber has reached the statutory limit.

Despite providing a comprehensive cleaning and anti-corrosion process, the machine runs on a 10-minute cycle in continuous operation and because of its extended conveyor can operate for up to an hour without the need for intervention from employees. In order to ensure that the required levels of particle cleanliness are always met, all three circuits have extensive filter systems. The pre-rinse circuit and the first cleaning circuit are fitted with double changeover filters so that used filters can be vacuum-dried and replaced without interrupting the operation of the machine. The second and third circuits (precision cleaning and anti-corrosion treatment respectively) have a newly developed combination filter housing, enabling a candle filter to be used instead of a cartridge to meet tougher cleanliness requirements. The machine also has an integrated bypass distillation unit which automatically reduces the oil (up to 20 litres per shift) and discharges it into a waste oil container. An active carbon adsorber is used to treat the process air. The distillation unit allows the operator to reduce the solvent content of the waste oil to below 1 percent. Since the machine has been in operation, very few problems have been encountered. Those that have occurred have generally been resolved quickly and easily by remote diagnosis and the Höckh telephone service. ┘

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