

## MODULAR CLEANING SYSTEMS

# Rapid support for flexible production processes

Manufacturing companies need cleaning systems which can adapt quickly and flexibly to changing workloads. Modular machines provide the necessary freedom for short-term expansion, because these solutions are more energy-efficient and less costly to purchase than a complete new system.

Coordinating varying levels of output, discontinued or new products and the redesign of existing items in the short term has been a challenge faced by many manufacturing companies, and not just in 2009, the year of the economic crisis. The operators of machinery have to meet their customers' high standards when it comes to product quality and delivery capacity. As a result, manufacturing companies and, in particular, suppliers to the automotive industry are constantly adjusting their processes throughout the value-added chain.

Increasingly short contracts often mean that investments in new equipment do not pay for themselves and the decisions about these investments are therefore made very difficult. In these cases, companies generally cannot justify buying new cleaning machines, because this usually results in higher production or unit costs. Flexible systems are needed which allow the maximum amount of freedom within specific boundaries and therefore provide the most efficient and cost-effective solution.

### Flexible, modular systems

Cleaning systems have to meet a wide range of requirements. Ideally it should be possible to integrate them into the existing material flow without problems.

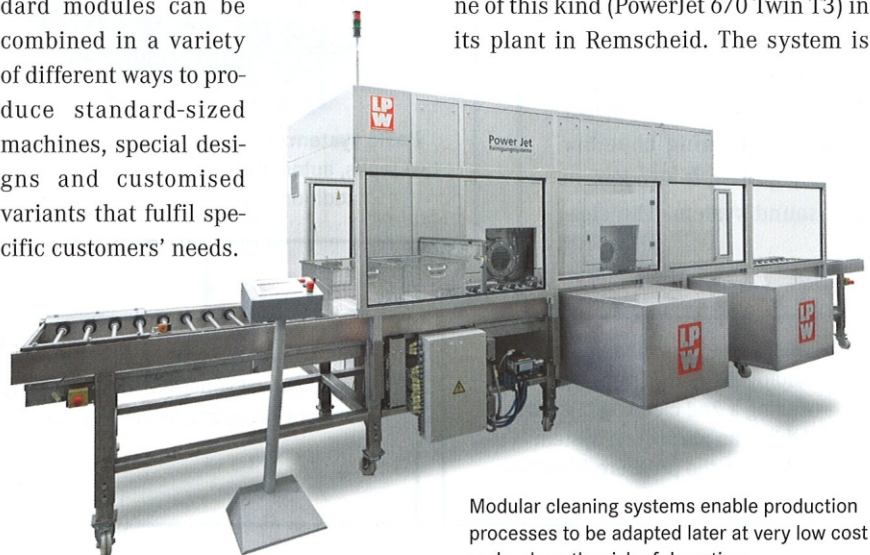
This usually means adjustments to the cycle time and modifications to products. The availability and ease-of-use of the overall system also play a major role. The most important requirement is the ability to use standard solutions for production support processes, such as deburring, parts cleaning, measuring and logistics flows.

Modular cleaning systems can meet all of these requirements. The cleaning machines can be used in varying combinations to provide different levels of cleaning quality, output, upgradability and operating costs. LPW Reinigungssysteme supplies modular systems of this kind from its PowerJet range. The standard modules can be combined in a variety of different ways to produce standard-sized machines, special designs and customised variants that fulfil specific customers' needs.

In addition, the machines use much less water and energy, with the result that the service life of the cleaning agent and the maintenance intervals are significantly longer. Overall the operating costs are up to 40% lower than those of conventional machines with an open design. Even the entry level machines are designed to be operated, maintained and serviced by staff without special experience and after only a short training session.

### Practical applications for modular machines

The German manufacturer of heating systems, Vaillant, has installed a machine of this kind (PowerJet 670 Twin T3) in its plant in Remscheid. The system is



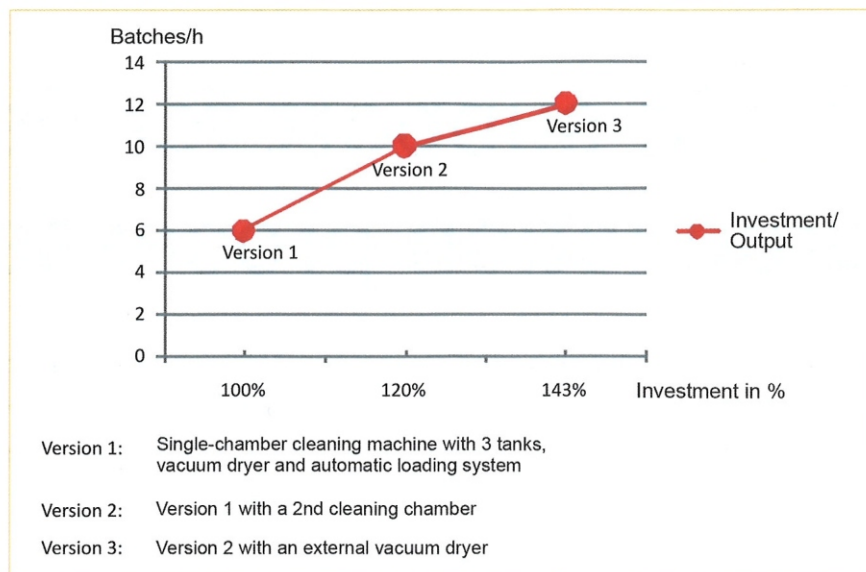
Modular cleaning systems enable production processes to be adapted later at very low cost and reduce the risk of downtime.

used to clean copper and steel pipes (with brass fittings) in order to remove oil residues and swarf. The company specified an hourly throughput of six to ten batches and a bath service life of between six and eight weeks. The parts have to be completely free of oil, grease and swarf before moving on to the next stage of the production process, which could be assembly, soldering or dispatch.

A cleaning system was designed to meet these specifications which consists of two cleaning chambers, three storage tanks, a gas-heated vaporiser unit, a bag filter system and an automatic loading function. The use of two cleaning chambers allows for a cycle time of 6 minutes per batch. By separating the final bath from the preliminary cleaning process in the first cleaning chamber, it has been possible to reduce carry-over and levels of residual dirt.

The engineering company Rudolf-Erich Müller GmbH & Co KG (REMOG), based in the German province of Lower Franconia, has also purchased a modular cleaning machine (PowerJet 670 T2) to clean hydraulic components made of cast iron after the thermal deburring process. The machine removes all traces of oxide from the surface and the drilled holes in the parts and has a throughput of six to eight batches per hour.

The machine is equipped with two storage tanks, an electrically heated vaporiser unit, one cleaning chamber and a bag filter. It also has an ultrasound system. The clean-



By choosing the correct basic modules, operators can significantly increase output while at the same time reducing costs.

ning performance and the separation of the cleaning agents in single-chamber systems allows for a flexible solution which offers significant benefits when compared with the conventional open cleaning machines that the company used previously. Energy consumption has been reduced by 40 percent, the new

machine takes up between 30 and 50 percent less space and maintenance costs have also fallen.

#### Single modules reduce the risk of downtime

The main features of a modular cleaning machine are the option of adding to or expanding the basic modules and the energy-efficient operation that the system provides. A further decisive factor is the high level of availability of the system as a whole, resulting from the use of standard components and tried-and-tested standard procedures. In addition, the processes can be broken down into redundant individual



#### Increasing the cleaning quality

- Adding a 2nd rinsing stage
- Adding a 2nd cleaning chamber
- Adding an ultrasound system
- Adjusting the pressure/flow rate

#### Increasing the bath service life

- Adding an oil separation system
- Distilling/vacuum distilling system

#### Increasing the throughput

- Adding a 2nd cleaning chamber
- External vacuum dryer
- Reducing the non-productive time

By combining different modules to produce a customised cleaning system, it is possible to adapt it to changes in the production process at later date.



units which reduces the risk of down-time and avoids the bottlenecks that can occur in conventional systems.

One of the primary advantages of a modular design, in particular when the system is enlarged at a later date, is the cost/benefit ratio. Instead of having to invest in new machines, companies can buy additional modules at a relatively low cost which provide significant increases in capacity. The use of fully redun-

dant modules allows production bottlenecks to be prevented.

The individual units which make up the machine are operated via a common control system. It is also possible to add further central modules, such as a shared system for recycling the cleaning agent. This enables additional capacity to be made available at any time. When the production volume is reduced, individual modules can be removed from the

process or even shut down. In addition, the operating costs of systems of this kind (including energy costs and machine wear) are always in proportion to the actual output.

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