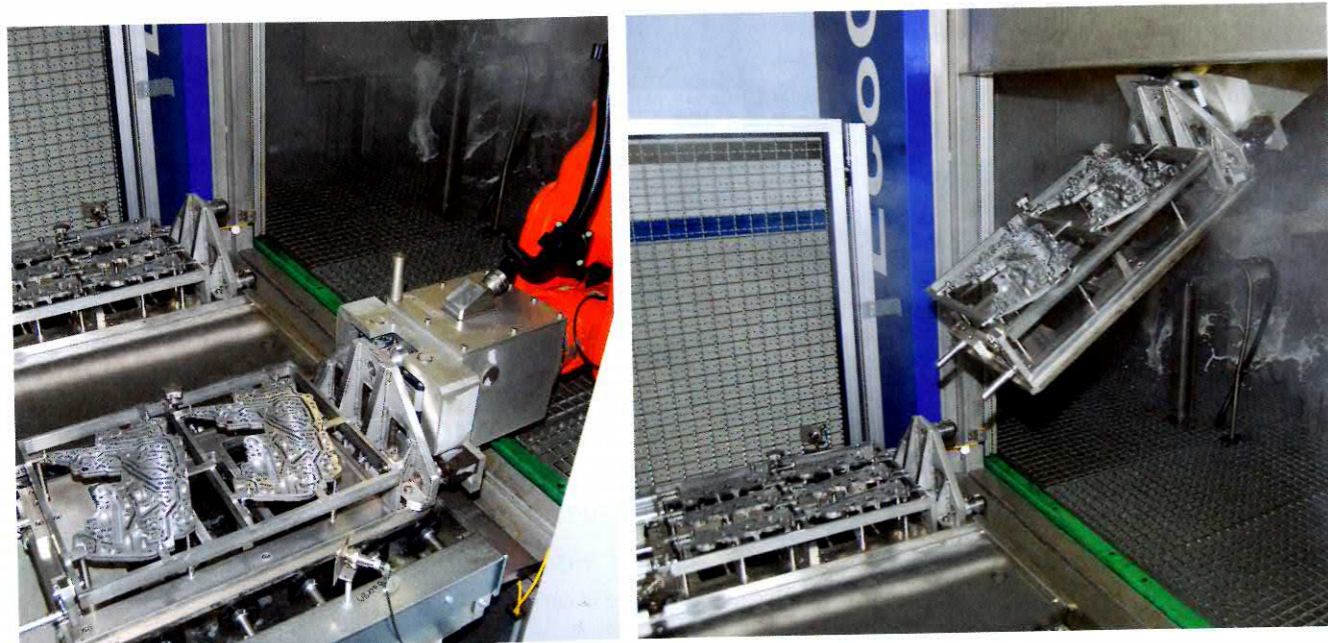


INCREASED FLEXIBILITY FOR CLEANING PROCESSES

No residual contamination in gearboxes

Automotive industry suppliers and OEMs set very high standards with regard to the residual contamination of die cast aluminium components for the latest double clutch gearboxes. A new cleaning system meets all the requirements and also offers high levels of flexibility.



The robot does not, as is normally the case, pick up the gearbox components itself and take them through the machine, but instead places them in special workpiece carriers before they are transported through the system.

In its plant in Sömmerda in Germany, Trimet Aluminium AG is using a new and highly flexible cleaning machine from Dürr Ecoclean to clean die cast aluminium components for double clutch gearboxes. The EcoCFlex cleaning machine, which has been specifically designed to meet the requirements of car manufacturers and suppliers, forms an integral part of Trimet's in-house parts cleaning system. The versatile robotic cleaning machine enables several differ-

ent components of control modules to be cleaned and deburred at the same time for the powertrain supplier BorgWarner.

High-quality die cast aluminium components from Sömmerda

The core business of Trimet Aluminium AG is metal trading, manufacturing, recycling and processing. At its Sömmerda site it operates an aluminium die casting plant where 140 employees produce complex die cast components for

the automotive industry. Recently, Trimet has begun providing a new industrial parts cleaning service for vehicle parts. "In order to ensure that hydraulic control modules for modern double clutch gearboxes function reliably, automotive industry suppliers and OEMs set high standards for the residual contamination of our die cast products. To be able to meet these standards every time, we decided to take responsibility for parts cleaning ourselves and to open up

a new business area which would give us a competitive advantage in the future," explains Roman Stolze, head of automotive process engineering at Trimet.

Changing market requirements

The requirement arose as a result of an order placed by powertrain specialist BorgWarner for the production, machining and cleaning of cover, passage and transfer bodies for double clutch gearboxes for two car manufacturers. Changes in the automotive market have resulted in OEMs and suppliers placing orders with Trimet not only for the production of parts, but also for machining and subsequent cleaning. Suppliers also become involved in the process of developing the parts at an increasingly early stage. Carsten Rudolph, a member of the process engineering team at Trimet in Sömmerda, explains: "There are a lot of companies which can produce die cast parts and some which can provide die casting and machining services, but only a few which can offer die casting, machining and parts cleaning. That was our competitive advantage on this project."

Parts with complex shapes

The die cast aluminium parts must meet high standards of dimensional stability and also fulfil very strict requirements relating to their residual contamination. By keeping the residual dirt in each component at a very low level, the contamination transferred to the complex hydraulic gearbox control modules can be minimised. As a result, the covers and bodies supplied by Trimet to BorgWarner can be assembled immediately. The maximum permitted size of the residual dirt particles is below 200 µm, making precision cleaning processes necessary. "There are many suppliers of cleaning machines, but very few of them succeed in combining high levels of flexibility and high standards of cleaning," says Roman Stolze. "However, the EcoCFlex from Dürr Ecoclean was the perfect solution to our requirements." In particular

in projects of this kind, the cleaning system must be flexible enough to adapt to the rapid changes in the production process. Taking an overall perspective, this is the only way of meeting requirements which include a wide range of products, high levels of component complexity, short innovation cycles and the increasing difficulty in predicting changes in the market and the arrival of new technologies.

Cleaning and deburring in one stage

The cleaning machine must be able to deburr the parts, as well as clean them. In addition, the machine has to be sufficiently flexible to accommodate components with a wide range of shapes. For this reason, the EcoCFlex for Trimet has been designed so that the interior robot does not, as is normally the case, pick up the parts itself and take them through the washing and deburring stations, but instead uses special workpiece carriers with standardised holders to transport the components through the machine. As a result, only the carriers need to be changed to allow one type of part to be cleaned one day and another the next. This flexibility ensures that the machine will be able to remain in use in the long term as planned.

The programmable workpiece transport system can be adjusted to each individual part, which enables the new cleaning machine to be used with a wide range of components. Even the injection flood washing programme and the high pressure nozzle system, with its rotating head for deburring components at pressures up to 450 bar and a water throughput of 70 litres/minute, are flexible enough to be adapted to the different types of parts. The nozzle system is fully adjustable and can be easily replaced. As a result, a series of different nozzle systems can be used one after another to deburr different types of parts.

The burrs on die cast aluminium parts often represent a particular problem during the deburring process. They are

not as brittle as burrs on steel and gun-metal which means that they frequently do not break off when pressure is applied, but instead simply bend over. Therefore, the high pressure nozzles must be of an adequate size and arranged in such a way that they generate sufficient pressure to remove the burrs effectively, without damaging the workpiece itself.

"The fact that we could test the process of cleaning and deburring our workpieces in advance in the Dürr Ecoclean technical centre was a huge benefit for us. Dürr's extensive experience with large OEMs and automotive industry suppliers and the many years of research that they have carried out were invaluable. As a result, we could fine-tune our EcoCFlex machine without the need for major on-site testing," says Roman Stolze, describing the coordination process which formed part of the testing and finalising phase. "The Dürr team gave us the best possible guidance and support at every stage of the process." Dürr Ecoclean also provided training for the operators of the new machine to ensure that they were well prepared. As a result, the in-house staff at Trimet are able to reprogram the machine easily and efficiently themselves.

Trimet plans to purchase a Universal 81W cleaning machine from Dürr Ecoclean to install next to the new EcoCFlex machine. As demand increases they may also install another EcoCFlex.

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