Advances in speed, efficiency and sustainability yield improved replacement transmissions

Efficient cleaning solution for use in transmission remanufacturing

By changing over from an aqueous cleaning process with numerous manual interventions to fully automatic cleaning in three closed systems using non-halogenated hydrocarbons, British transmission remanufacturer ATP Industries Group not only managed to boost product quality. The switch also yielded substantial improvements in cost efficiency, working conditions and sustainability.

Rebuilding vehicle components such as transmissions is an activity that saves raw materials, energy and costs. This is the remit of ATP Industries Group Ltd., an enterprise founded by Alan Smart in 1969. Based in Cannock Wood in the English county of Staffordshire, the company has evolved into Europe's largest independent remanufacturer of automatic and manual transmissions, transfer boxes and other mechanical and mechatronic drivetrain components for cars and off-highway vehicles. Their customers include many vehicle manufacturers to whom they supply products and services into 35 countries worldwide out of their headquarters plant and subsidiary sites in the U.S. and China. The quality of the product, rebuilt to the most exacting global standards, is an important success factor. Addressing this requirement, ATP has developed solutions including, e.g., a highly sophisticated, technically demanding test rig for precise validation and calibration of the electronic, hydraulic, mechanical and software functions of dual clutch transmissions. In recognition of this innovation, ATP was honoured with Britain's most prestigious industry award, the Queen's Award for Enterprises – Innovation Category, in 2016.

Part cleanliness – indispensable for high product quality

In line with the quality standard, all components of a reconditioned unit must be like new, both technically and visually. To achieve this objective, the incoming transmissions and components are initially cleaned and disassembled by hand. Next, the individual parts made of aluminium, steel, cast iron, plastics and other materials were pre-cleaned with brushes and a solvent at dedicated cleaning stations in order to remove oils, greases, carbon deposits and road dirt. Any foreign matter still adhering to the parts was removed in simple, semi-automatic washers using an aqueous medium, and then the parts were dried manually with compressed air. This was, on the one hand, a very time and labour-consuming workflow. Moreover, around 20% of all cleaned parts were rejected as not clean enough by Quality Control and had to pass through the cleaning process again. On the other hand, the cleaning method gave rise to an unwholesome work environment with elevated air humidity, airborne oil particles, and high noise levels. Operators in these areas had to wear ear protectors. Therefore, the company consulted various cleaning equipment manufacturers to learn about alternatives.

Convincing test results and machine concept

Prompted by brisk growth in demand and the company's own rising quality requirements, ATP's management carried out a series of initial cleaning trials at the Ecoclean's U.K. Test Center. This was rounded out by further testing with genuine parts at the Filderstadt Test Facility in Germany. The results were so impressive that the company ordered two EcoCcore type cleaning systems right away.

The innovative solvent-based cleaning system that can work with either hydrocarbons or modified alcohol is run with a non-halogenated hydrocarbon at ATP. Operating under full vacuum, it features a built-in distilling system plus full-flow and bypass filtration for continuous solvent reconditioning, thus providing a long solvent

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life and low consumption. Its extensive standard equipment package includes two flood tanks for the coarse and fine cleaning treatment as well as heat recuperation.

Significant quality improvement through full process automation

Following disassembly, the transmission parts are arranged in a defined position in cleaning baskets measuring up to 670 x 480 x 400 mm (L x W x H), adapted to the size of the work chamber. These baskets are conveyed to the machines in the cleaning section where an operator selects the appropriate cleaning program. At that time, ATP used 9 different programs with process parameters set to match the respective transmission type, material, and degree of contamination. The cleaning cycle takes between 6 and 14 minutes to complete. The company managed to clean 65 baskets per shift in each system, with just one operator in attendance. Before, the company needed between 8 and 10 operators to clean the same parts.

To achieve the required cleaning result in such a short time, the EcoCcore is equipped with innovative process technology such as, e.g., advance steam degreasing. With this technology, the oil-containing solvent is not passed into the flood tank, contrary to common practice, but is directed straight into the distillation unit. This design minimizes oil deposits in the flood tank while counteracting the accumulation of oil in the solvent. Moreover, the machines feature ultrasonic devices in addition to the standard injection flood wash system. Ultrasound and filtration can be used simultaneously, and the volumetric flow rate is frequency-controlled. Particles are thus discharged concurrently as cleaning proceeds and cannot settle in the work chamber. The company checked their cleaning quality by gravimetric tests once per week. With the EcoCcore, they have been achieving approx. 30% better results on a consistent basis.

A third cleaning system for mechatronic parts

The impressive quality gain prompted the company to adopt automatic cleaning also for the mechatronic components, which were still being cleaned manually. Therefore, ATP invested in an EcoCbase machine which is likewise equipped with two fluid tanks plus ultrasonic cleaning and operates with a hydrocarbon cleaning medium as well. The work chamber is designed for cleaning baskets measuring up to 530 x 320 x 200 mm (L x W x H). The throughput of this machine amounts to 35 to 40 baskets per shift.

Optimization in every respect

The improved cleaning results not only helped ATP to further optimize product quality, which has already generated additional business. The company also reports substantial gains in productivity and cost-efficiency. Likewise, the new cleaning process is top notch in terms of sustainability. The water consumption of the old cleaning systems amounted to around 100,000 liters per year, a volume that is now saved. This is in addition to the savings on cleaning chemicals. The company was expecting the payback on the new machines even sooner than they had calculated when decided to go for Ecoclean solutions. In addition, ATP reports about the benefit from a much more pleasant and cleaner work environment.

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Captions

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The SBS Ecoclean Group (former Dürr Ecoclean) develops, manufactures and distributes future-oriented machines, systems and services for industrial parts cleaning and surface processing. These solutions, which are technology leaders, support companies around the world to manufacture their products efficiently and sustainably in high quality. The company's customers come from the automotive and supplier industry as well as from the broad and diversified industrial market, such as medical engineering, micro manufacturing, precision mechanics, machine building and optical industry, aerospace and aviation as well as energy technologies. Ecoclean's success is based on customer focus, innovation, cutting-edge technology, sustainability, diversity and respect. The company has twelve sites worldwide in nine countries with approximately 900 employees.

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