

BUSINESS MODELS

MOBILE LABORATORY – PARTICLE COUNTER FOR HYDRAULIC FLUIDS

TITLE

PRODUCTS AND APPLICATIONS



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Particle analysis is an important preventative maintenance method. Stauff is now launching the third generation of its particle counter, which can be regularly used to very precisely measure the degree of contamination of hydraulic fluids. Hydraulic systems are efficiently monitored to maximise the operating times of mobile and stationary systems.

In doing so, manufacturers' specifications, documentation requirements, and standards are met with minimal effort in practice.

H ydraulic systems are sensitive to contamination. Even microscopically small solid particles act like abrasives and can cause abrasion and mechanical wear on the surfaces of components and parts, like pumps, valves and cylinders, when fluids flow through them. Especially at high operating pressures and speeds micro-cracks and wells can occur on metal surfaces or their coatings. Abrasion creates new particles, producing a self-reinforcing cycle. Moisture and acidic impurities, the formation of which is accelerated by metal particles in the hydraulic oil, lead to corrosion on metallic components. In the worst case scenario, this then initiates further chemical processes, such as the removal of additives in the hydraulic oil, which can cause the oil to "age" prematurely, thereby losing its compressibility.

PREVENTATIVE MAINTENANCE THROUGH PARTICLE ANALYSIS

The cost of an oil change far exceeds the price of the hydraulic oil: the machines need to be taken out of service, and the used oil must be pumped out, and properly disposed of. The entire system is cleaned and maintained. This includes checking and, if necessary, replacing joints and seals. More severe than an oil change is the possible damage to components, seals and components that may have already occurred. This damage can affect operational safety, efficiency and, last but not least, the service life of a hydraulic system. Regular measurements offer the benefit that any contamination can be detected in good time, and filter concepts can also be checked and individually adapted to the respective operating conditions, e.g. dirt and dust in the working environment. The oil purity class to be achieved is an important criterion for selection of the appropriate filtration.

Many manufacturers of mobile or stationary hydraulic systems define the oil purity class and the test cycles to be adhered to in their warranty and maintenance conditions. Users then have an obligation to document this. If they are unable to prove that checks have been carried out in accordance with the contracts

they have concluded, they may lose their warranty claims in the event of damage.

THE MOBILE LABORATORY – 3RD-GENERATION PARTICLE MEASURING UNIT

The main task of particle measuring units is to determine the number and size of the solid particles in the hydraulic fluid. Quantitative determination of the different sizes and concentration of particles enables operators to reliably assess the degree of contamination. These measurements are classified according to international standards to ensure the uniform evaluation of the fluid unit.

Stauff has now introduced the third generation of its portable particle counter, the LasPaC-3-P, for all mineral oils and petroleum-based fluids. The range also includes units that are compatible with phosphate esters and water-glycol mixtures. Like its two predecessors, the new model works on the light-blocking principle, using LED technology instead of laser technology. The principle is always the same: when a particle in the oil passes through

THE DEGREE OF CONTAMINATION IS DETERMINED USING THE LIGHT-BLOCKING PRINCIPLE

the light beam, the amount of light that hits the photodiode decreases. The degree of contamination can be reliably determined as this change is directly proportional to the particle size. The purity classes are evaluated according to different standards (e.g. ISO 4406, NAS 1638, AS4059/ISO1218, BGT14039, GJB420B etc.) The latest generation is optionally available with a water-in-oil sensor with integrated temperature measurement, so that the "relative humidity" variable in the hydraulic oil can also be mapped.



01 The analysis data is read off directly on the screen



02



03

02 The 7" touch screen and an integrated printer make it easier to use the unit

03 Measurements can be carried out during ongoing operation

FAST AND PRECISE PARTICLE ANALYSIS

The latest generation of Stauff particle counter offers users multiple benefits: its analysis volume has been significantly increased from 15 ml to a maximum of 100 ml compared to the previous model. The sample size can be freely selected, with the proviso that the higher the measurement volume, the more precise the measurement. The new model enables even very well purified liquids to be analysed even more precisely. The measuring speed is significantly higher, with an analysis of 100 ml taking just one minute. By comparison, particle analysis of 15 ml took three minutes with the previous unit. Operators requiring even faster results can reduce the sample volume. The flushing time is also

shortened by the optimised sensor design with an electrically controlled flushing valve, so that the next measurement can be started even more quickly.

CONVENIENT TO USE DURING ONGOING OPERATION

As with all Stauff product groups, Stauff Diagnostics (Diagnostics and Electronics) also plays an important role in its practical operation. In addition to perfect technical performance and measuring accuracy, it is always a matter of making operation as convenient as possible for the user. The LasPaC-3-P can be connected to the operational system within a pressure range of 2 to 420 bar. The unit is designed as a robust industrial trolley in which all components – a residual oil container for subsequent disposal

UP TO 4,000 MEASURED RESULTS CAN BE SAVED INTERNALLY BY THE PARTICLE COUNTER

and other accessories, such as connections and hoses – can be conveniently transported. The unit is operated using a 7" touch screen. Analysis data can be evaluated directly on the screen and printed off on the integrated printer. Up to 4000 measured results can be saved internally and transferred to a PC either directly or using a USB memory stick. "Stauff Contamination Analysis" PC software is included with the unit. A long-life lithium-ion battery provides for stand-alone operation directly at the measuring point and can easily be replaced by the operator.

INTERVIEW

Finnentrop-based Georg Menshen GmbH & Co. KG was one of the first users of the Stauff LasPaC-3-P particle counter. The company is a world leader in the production of plastic closures, injection-moulded packaging components, and coffee capsules. In the interview, Andy Zschunke, Maintenance Team Leader, reports on his positive experiences in practice.

On which systems and machines have you already used the Stauff particle counter?

We conducted comparative measurements on different manufacturers' injection-moulding machines. This involves annual standard maintenance as part of preventative maintenance, and also meeting customer requirements, documentation obligations, and certification.

Georg Menshen GmbH uses the particle counter in the production of plastic closures, injection-moulded packaging components, and coffee capsules



What requirements do you have with regard to the documentation of the measured results, and how does the LasPaC-3-P help with this?

A digital overview, the possibility of trend analysis on a dashboard, and a visual presentation of limit violations are critical requirements. In this respect, the new generation is significantly superior to the previous model: its menu navigation is more intuitive. Its large 7" touch screen, which provides a good colour display of the measured results, also contributes to the ease of operation of the unit. It is beneficial for our internal processes that the measured data can be analysed and evaluated directly on the screen or, with this latest generation, transferred on a USB-C memory stick to the PC software for further processing

You have been using the previous model of the Stauff particle measuring unit for over 10 years. Where do you see further improvements with the new measuring unit?

The measuring speed is considerably faster than on the previous model. Just one minute for a 100 ml oil sample without the need to shut down the machine is really enormously fast. In our large production facilities, it is beneficial that the unit is designed as a trolley with all the accessories built in. And, of course, the long battery life in mobile use is very practical for when there is no power socket nearby.

TESTED AND PROVEN

The first generation of Stauff particle measuring units was launched in the early 2000s and has been successfully utilised by manufacturers of mobile and stationary hydraulic systems across all industries. Today, hydraulic retailers and service providers form Stauff's largest customer group. They offer particle analysis as part of maintenance contracts.

Original equipment manufacturers (OEMs) use the units internally and in after-sales service for their machines. One of the first users of the latest generation of the Stauff LasPaC-3-P particle counter is the world market leader for plastic closures, injection-moulded packaging components, and coffee capsules, Finnentrop-based Georg Menshen GmbH & Co. KG. The customers of the company, which has 14 sites in 11 countries, include numerous international brands and industrial companies from the cosmetics, chemicals, detergents and cleaning products, food and beverage sectors. The range of products packaged with Menshen products ranges from baby food, high-quality personal care products to high-purity products for specialist chemicals and pharmaceuticals. Stauff particle counters have been used for over 10 years for the maintenance and testing of around 130 injection-moulding machines at the company's production site in Finnentrop.

Users at the site have given exclusively positive feedback about the revised features of the LasPaC-3-P.

Images: Stauff

www.stauff.com

PRECISE 

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MEASURING SPEED

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