

Hidden gem

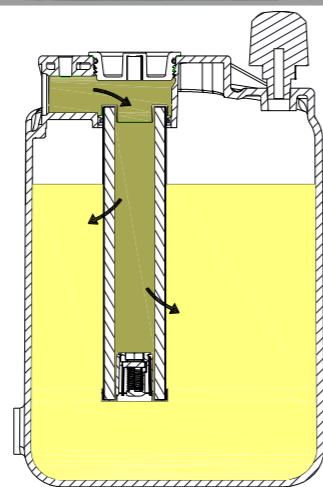
DESIGNED TO SAVE SPACE AND IMPROVE PERFORMANCE, THE LATEST RETURN LINE FILTRATION TECHNOLOGY FOR USE IN PLASTIC RESERVOIRS IS WELL WORTH SEEKING OUT



ABOVE: Integrated filtration systems cut leaks and improve efficiency
 RIGHT: The latest filters can reduce initial build costs by up to 25%

The increasing demands for smaller, more productive, and more cost-effective industrial vehicles and equipment has resulted in OEMs facing pressure to provide more-compact and lower-cost hydraulic filtration solutions. In response, Parker Hannifin – a global leader in motion and control technologies – has developed a new generation of screw-in filters that meet both these needs while increasing system performance.

Return line filtration plays an important role in the operation of industrial vehicles. In addition to removing the contamination being generated by the hydraulic system itself, return line filtration effectively removes contaminants that have entered the system from outside the vehicle



(through cylinder or shaft seals, for example), and prevents the contamination from entering the reservoir.

Increasingly, plastic reservoirs are being used in mobile applications. This can make it difficult to achieve an effective seal with components such as tank-top-mounted return line filters, as the co-polymer material is more flexible than metal. Changes in temperature and pressure can also result in deformation of the plastic reservoir material. Potential oil leakages can be a serious problem too, with more stringent environmental regulations being introduced, and the expense of clean-up operations spiralling for end users.

There is now a trend to downsize the total volume of the reservoir, cutting initial costs by reducing the amount of oil in the system. However, this can potentially damage the oil used (particularly in a system incorporating a plastic reservoir where the oil cools more slowly), as its working temperature is raised above the recommended value. Another function of the reservoir is to de-aerate the hydraulic fluid. With reduced oil volume in the reservoir, the time available for removal of air from the hydraulic fluid is reduced.

Typically, air makes the hydraulic fluid more compressible, which reduces the overall system efficiency as more energy is needed to maintain performance.

The level of system controllability is reduced as the volume of air in the system is increased. For example, hydraulically operated booms can display unwanted movement as the oil becomes more compressible. Similarly, hydraulic pumps are generally affected by excessive air in the hydraulic fluid, reducing system lifetime due to cavitation.

Integrated filtration

An integrated hydraulic filter solution can solve many of these problems. As the space above the reservoir is typically limited,



often covered by shaped bodywork or valve islands, housing the return line filter inside the hydraulic tank allows the valve island or bodywork to be lowered, making the unit more compact. This innovative filter design can also contribute to an increase in the internal tank volume within the same external space envelope.

One example of this new technology is Parker's PT Screw-in Filter, which provides a compact solution for smaller systems. This filter has been successfully implemented by various OEMs for applications such as mini-excavators, skid-steer loaders, and turf equipment, with Parker providing total project management in some cases.

The overall arrangement incorporates a customised reservoir with connections for return and suction lines. The contaminated return oil flows into the reservoir and is filtered by the PT screw-in return line filter. This reservoir solution makes the use of any reinforcement flange obsolete, typically reducing initial costs by over 25% and halving the amount of sealed connections. The reservoir becomes the filter housing, avoiding the need to apply the tank-top-mounted filter head and tank reinforcement.

The PT solution features a flow direction from 'In to Out' through the filter. When

servicing the hydraulic system, the one-part filter cap, including the filter media and bypass valve, can be simply rotated and pulled out of the reservoir. Oil dropping back into the tank has been filtered, and therefore recontamination of the reservoir can be avoided.

The customised reservoir can be used with baffle plates to create a specific flow path or with an airtight diffuser, which not only avoids air ingress into the return line, but also oil entry in the reservoir at a specific level.

Because it is a single integrated filtration solution, the PT Screw-in Filter protects the OEM aftermarket against piracy. Oil cleanliness level has a direct impact on the efficiency, performance, reliability and safety of hydraulic systems. By excluding the possible use of non-original filter parts, not only is the quality of filtration guaranteed, but end users can also benefit from an extended warranty on the complete solution.

Meeting bigger challenges

For larger reservoirs, typically bigger than 200 litres, Parker Hannifin has developed the INAGB filter with integrated breather. In addition to the benefits offered by the



PT solution, the INAGB filter also features both a return line filter and reservoir air filter integrated under one reusable cover plate, making maintenance simple and safeguarding performance.

The air filter incorporates an integral labyrinth, which helps to avoid oil leakage through the air filter. This is a common problem in mobile equipment in non off-highway operation, as vehicle dynamics cause continuous fluctuation of the oil level in the reservoir. Innovative features such as this make the INAGB filter an environmentally friendly solution.

In summary, integrated filtration solutions provide a number of benefits to OEMs and end users alike, enabling more cost-effective reservoirs to be installed that have 50% fewer potential leakage points than conventional designs. In addition to providing a compact filtration solution, with the option of integrated air filtration the new technology allows the quality of the filtration to be ensured, resulting in consistently high performance from off-highway vehicles. **IVT**

Marco van Boven is marketing manager Hydraulic Filtration for the Hydraulic Filter Division Europe of Parker Hannifin

ABOVE: Screw-in filters offer a compact solution

CONTACT
www.parker.com
epic@parker.com