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Parker Filtration Moves Forward with New Technologies in Fluid Cleanliness Control and Hydraulic System Monitoring

Marco van Boven, Marketing Manager for the HFDE Hydraulic Filtration Business Unit of Parker Hannifin, looks beyond the customary solution to a flexible approach in preventing breakdown of a system and extending the life time of its components.

For more than 50 years, Parker Filtration has been designing and manufacturing hydraulic & lubrication fluid filtration solutions for a wide variety of industrial and mobile markets. In particular, in today's market, industries call for innovative solutions related to the development of 'next generation' equipment.

Often OEM's deal with complicated technologies to find solutions in order that they can improve the performance and efficiency of equipment in parallel with reducing the cost of manufacturing and ownership. Not only new technologies but also a complete review of the system enables Parker to develop dedicated solutions. In Parker we call it "Engineering your success".

Parker's Hydraulic Filtration Division looks beyond the customary solution to a flexible approach in preventing breakdown of a system and extending the life time of its components.

The complete system is analyzed based on the review of value areas:

- System design & manufacturing
- System performance
- System sustainability
- Sustainable environment
- Energy Control
- Recycling
- Aftermarket

In general, it is the correlation between cleanliness level control of systems and the impact for the value areas that is not always recognized.

System Design & Manufacturing

This important area offers the opportunity to integrate the filtration function with other system components. Parker's wide range of products represent the possibility to combine in-line filter housings with pumps or a valve island. This example depicts a charge pump with pressure filter for a hydrostatic drive system. (Picture 1)

Picture 1



Hydraulic pump with integrated
pressure filter

Reducing complexity, cost, and responsibility goes hand in hand with more compact solutions and the supply of complete pre-assembled kits does not only simplify the supply chain, it also contributes to absolute clarity related to product liability.

New technologies related to filter media - pumps & valves, seal technology and condition monitoring can be integrated more efficiently by starting with the analysis of the complete system upfront.

Last but not least is the importance of condition monitoring. Validation of the condition of the system prior to delivery to the market in the manufacturers' assembly area allows OEM's and system builders to implement direct actions in the assembly environment.

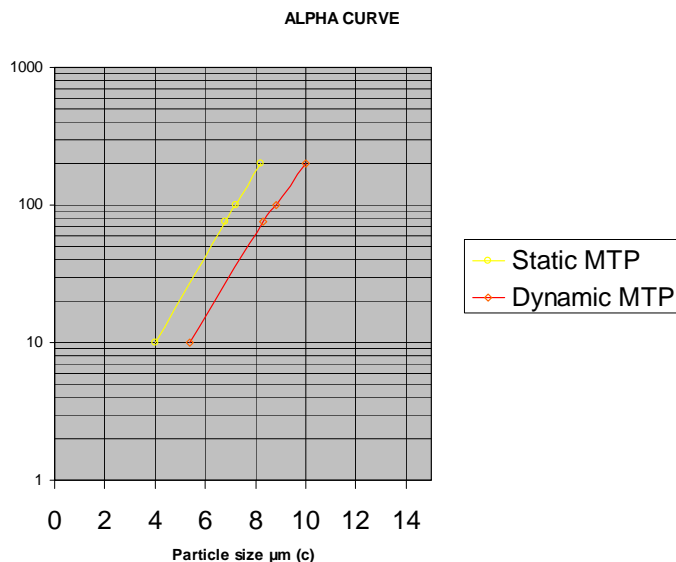
System Performance

The fundamental question is - what is important? Each application is unique in terms of usage and therefore Parker focuses on specific system requirements related to:

- Productivity
- Controllability
- Reliability
- Safety

Contamination impacts on the total system performance. Not only is over 80% of system malfunction directly attributable to contamination, it also impacts on equipment efficiency and controllability. A classic example is the hydraulically operated boom of truck mounted cranes where contamination can hinder the smooth control of oil divided through the system by the valves, resulting in reducing levels of controllability. The movement of the boom will not be smooth which makes the accurate handling of the load connection to the boom not only difficult but even dangerous in public environments for example.

Often, filter media is not selected based on its performance under dynamic circumstances. With frequent pressure and flow fluctuations, the efficiency of filter media is in general decline. Parker's Microglass filter media technology and product design minimizes the impact of system dynamics on filtration efficiency. Graph 1 depicts non-genuine Parker filter media compared in static and dynamic filter Multipass testing. For particles larger than 8 micron the removal efficiency declines by 70% typically.



System Sustainability

Aspects as life cycle cost, extended service intervals, oil and component life time extension are taken into account to achieve high levels of system sustainability.

Monitoring a system is essential, not only during service events but thanks to compact technology more and more as continuous measurement. Laser technologies allow Parker to integrate fluid particle counting with other sensors, for example for the measurement of water content or other fluid parameters. The consolidated output of the sensors allows users of equipment to reduce the downtime of equipment due to the introduction of predictive maintenance.

Safeguarding the use of quality products reduces downtime in industry. To prevent unknown filter media being used for replacement cartridges, Parker offers an extended range of patented filter element designs, which helps exclude the use of non - genuine parts. This contributes to the important goal of achieving and maintaining the required fluid cleanliness level. In addition to this, Parker's Microglass media is also available for the ParFit filter element family, a range of elements for replacement of non-genuine Parker elements.

A final word about filter efficiency and that is that Parker focuses on the required cleanliness level and fluid condition needed for the system, not on the removal efficiency of one particular particle size.

Filtration	
Productivity & Controllability	Guaranteed Oil cleanliness level
	Oil life time extension
	System component life time extension

Condition Monitoring	
Safety & Reliability	Quality index of Fluid and system
	Predictable maintenance
	Lower cost of ownership

Sustainable Environment

Parker is eager to minimize the impact of any hydraulic system on the environment and aspects such as noise and vibration reduction as well as ease of maintenance are important factors. Besides providing high quality Parker hoses, pipes and connectors the number of potential leakage points can be reduced by integrating various system components. An example was given in Picture 1 with the charge pump and filter combined in one pre-assembled unit.

Energy Control

With cost fluctuation and availability of fuel in the future and awareness of carbon footprints, filtration technology contributes to safe energy.

Parker's filter media is designed to lower the pressure lost across the filter element during its life time. Key to achieving this goal is optimal distribution of contamination by using the complete thickness of filter layers, not only its surface!

The more frequent use of load sensing systems and accumulators has a direct impact on the selection of a filter. With the load sensing system running in idle mode, the average oil flow through the filter is reducing. This saves energy but the opportunity given to the filter to remove the contamination present in the system is significantly reduced. Parker's unique composition of the filter media layers and the way the fibres interact with the fluid and contamination allows system designers to meet the required cleanliness levels with a reduced volume of oil flowing through the filter.

When accumulated energy is released, the difference in filter quality is reflected in its ability to avoid migration of captured contamination. Parker applies software simulation models to design products with improved capability to deal with significant fluctuations in pressure and flow, optimizing flow paths through the system.

Recycling

Contaminated filter elements are more often classified as chemical waste. Perceived as a simple system component, the filter cartridge represents high cost related to its disposal. Parker reflects their ecological responsibility in designing and marketing filters with the maximum use of reusable parts. Only the contaminated filter pleat pack requires replacement, typically reducing the amount of waste (weight) and cost by over 50%. It reflects our belief that Ecology and Economy can go hand in hand in 'smart' product design.

After Market

New material technologies are adapted by Parker to design new product components. Based on intensive R&D and engineering programmes, new and unique solutions are provided which excludes pirate type manufacturers from putting forward alternative after market parts with unknown filtration quality.

The human eye cannot see particles smaller than 40 micron; hence the quality of filters cannot be determined by visual inspection of products.

Parker's filter media technology provides optimum protection of a system against contamination. Due to unique product designs, Parker can provide extended warranty for its components when genuine Parker filtration products are specified.

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