

Optimizing Filtration on Tug Boats

Increase system reliability on tug boats by fitting bypass filtration units on hydraulic systems.



Hydraulic deck equipment such as towing / anchor winches and deck cranes are powered by a hydraulic system. The system reliability of this system is directly linked to the condition and cleanliness of the oil. Over time, the oil within the hydraulic system will become contaminated due to the extreme environment, heavy workloads and continuous use. The buildup of these contaminants will start to wear out the components, reducing the lifespan and creating possible unplanned maintenance and downtime.

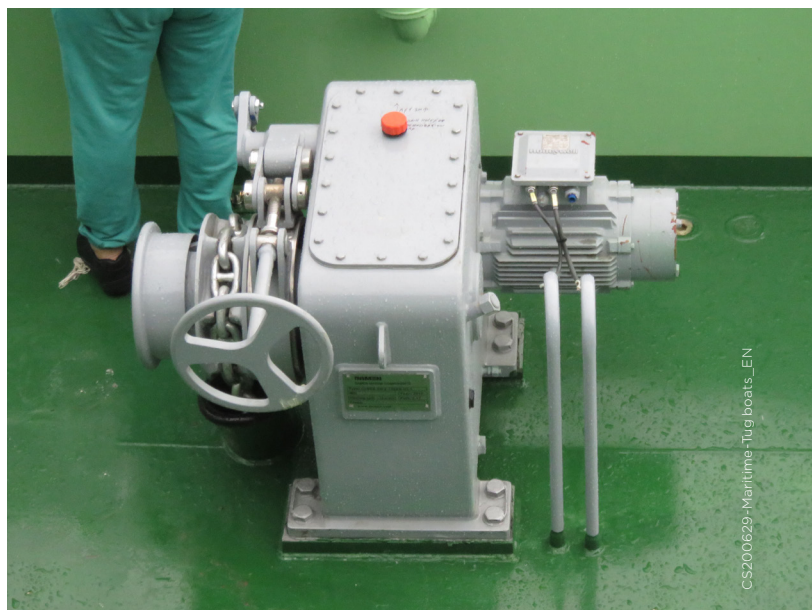
Doedijns, a Dutch producer of hydraulic power units (HPU), is a preferred supplier for a big tug boat manufacturer. Together with RMF Systems they started a project with the goal to improve oil cleanliness by changing the filtration set-up. Cleanliness goal was set to \leq ISO 19/17/14. In order to achieve this goal, efficient filtration was necessary.

System Specifications

Oil Type: Mobil DTE 10 EXCEL 46

Oil Volume: 700 liter

Current set-up return filter & drain filter	Improved set-up return filter & by-pass filter
<ul style="list-style-type: none"> 10 micron glass fiber elements in both filters 	<ul style="list-style-type: none"> 10 micron glass fiber element in return filter Depth filtration installed in bypass
<p>Filtration of the drain flow needs to be monitored thoroughly. Increased drain pressure is not desirable as this can harm the pump.</p> <p>Both filters are equipped with 10 micron filters. Smaller particles in the oil are therefore not filtered efficiently. These particles do need to be taken into consideration as they will affect the oil lifetime and the wear of components (LCC).</p>	<p>Drain flow remains unfiltered ensuring zero pressure drop.</p> <p>The added RMF Bypass Unit (BPU) focuses on the smaller particles (<10 micron). The filter material is also capable of absorbing water, preventing chemical deterioration of the oil and the formation of rust.</p>



Working Principle Bypass Unit

The Bypass Unit (BPU) uses an extreme efficient cellulose filter element which is able to remove both solid particles and moisture from the hydraulic system in a single pass. The BPU is connected directly to a pressure line of the hydraulic power unit by using a specially designed, integrated pressure compensated flow control valve. The oil stream passes through the filter medium before returning back into the hydraulic reservoir of the HPU. The amount of oil extracted from the main system is insignificant and will not affect operation of the main system.

The BPU ensures that the hydraulic oil is continually cleaned. The continuous cleaning considerably reduces the amount of contaminants flowing through the oil. This results in extended oil lifetime, component lifetime and inline filters. This in turn leads to less maintenance and expenditures on buying and disposing of oil. Over a 20 year period, operating with this filter unit can reduce lifecycle costs by almost 37%.



Decision and Results

In addition to all technical benefits of the RMF Bypass unit, the economical aspect played a big part in the decision making. By comparing all the benefits, the choice was made to install a BPU1B and a return filter on the hydraulic power pack. The implementation of the BPU and a return filter, resulted in improved oil cleanliness levels without exceeding the budget price of the hydraulic powerpack, a win-win situation. In addition to hydraulic filters a KL96R desiccant breather was installed to protect the head space of the HPU from moisture and contaminated air.

6 months after the installation on the HPU, the first lab analysis sample was taken. The ISO cleanliness level was improved to ISO 17/14/10. That is considerably better than the set goal of ISO 19/17/14. Due to this positive result, the Bypass unit is specified as a standard required filter on each hydraulic power pack by the OEM. Doedijns installs a BPU1B on each new hydraulic power pack that is sold. Doedijns also recommends installing a BPU as a retrofit on all existing Hydraulic power packs.

	Old	Improved (6 months after BPU installation)
ISO Cleanliness Level	19/17/14	17/14/10

In total, RMF Systems provided 55 Bypass Units on tug boats, providing these tug boats with better filtration, cleaner oil, longer lasting components, higher reliability and ROI.

