



CJC[®] Oil Care is a Must for Green Shipping

Application Study | Lube Oil Care for 4-Stroke Diesel Engines



Chemical Tanker, 19,800 GT
Engines MAN L23/30H, 800/960 kW



www.cjc.de



Application Study

Separator vs. CJC® Oil Care System – comparison field test

Engines

Vessel: Chemical tanker, 19,800 GT
Engines: MAN L23/30H, 800/960 kW (3 pieces)
Lube oil: Chevron TARO 30 DP30
Fuel: HFO RMG < 380 cSt, Sulphur: < 3,5 %

Test: Separator vs. CJC® Oil Care System

Test period: 8 months
Running hours: 4,982 RHs
Last total oil change: at start of test after 3,107 RHs

Conventional lubrication oil treatment:

One separator for three engines (DG#1, DG#2 and DG#3) as well as one centrifugal by-pass filter („glacier filter“) for each engine.

Newly installed CJC® Oil Care System:

During the test period, a CJC® Oil Care System 27/108 for continuous fine filtration and drying (24/7/365) was installed on each engine. The automatic temperature controlled flow ensures optimum operation and the highest filtration efficiency.

Pump flow: 280 L/h. (0.3 L/kWh), nominal

Conclusion of the ship owner

>>> LUBE OIL CONSUMPTION

The lube oil consumption decreased by **40 - 60 %** (no sludge, improved engine performance). The extended oil life-time and provided long-term lubrication is a result of the cleaner oil achieved by the enormous filter efficiency.

>>> CO₂-FOOTPRINT

Approx. 10,400 kg CO₂ per year and vessel are saved because the amount of sludge to be disposed of decreased by Ø 4.000 litres. Thermal disposal of waste oil and sludge causes approx. 2.6 kg CO₂ per litre. In total five vessels are retrofitted with CJC®, i. e. **> 52,000 kg CO₂ are avoided each year.**

>>> ENGINE RELIABILITY

To be able to verify if engine reliability improved, the full period of engine running between revisions must be monitored and analyzed. The maintenance and service time spent by the crew is an important indicator. The crew involved in the test evaluate the project as positive:

- easy to operate by the crew
- minimal maintenance requirements (insert replacement)
- Plug-and-Play-Installation

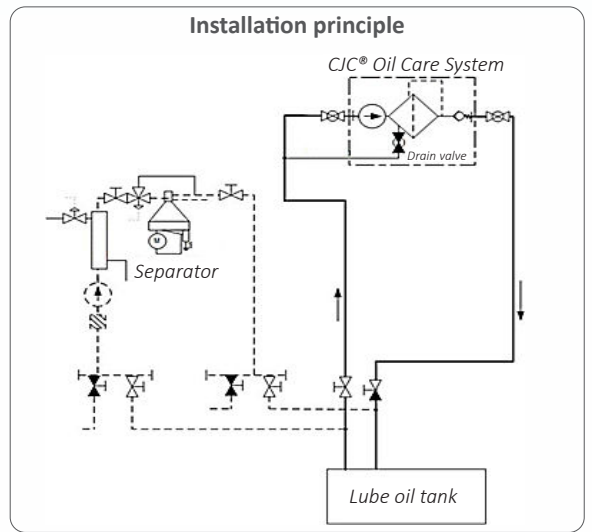
The improved oil cleanliness reached by CJC® Oil Care Systems has a positive impact on engine reliability.

SAVINGS

>>> More than 13,000 EUR are saved per year and vessel by using the CJC® Oil Care System. In total five vessels are retrofitted with CJC®, i. e. **the ship owner saves > 66,000 EUR each year.**



Installed CJC® Oil Care Systems 27/108



Specific lube oil consumption (SLOC)			
	Engine DG#1	Engine DG#2	Engine DG#3
Running hours	1,145	8,069	6,680
Oil consumption [l]	1,805	2,685	2,260
SLOC _{MCR} * [g/kWh]	1.58	0.33	0.34

* MCR = Maximum Continuous Rating

Savings - retrofit	
Energy consumption <i>Separator:</i> 1 x 4 kW x 23 h x 300 days + preheater	5,100 EUR
<i>CJC® Oil Care System:</i> 3 x 0.3 kW x 24 h x 360 days	
Oil consumption Ø approx. 4,000 L x 1.06 EUR/L	4,240 EUR
Maintenance, spare parts separator vs. filter inserts	4,000 EUR
Annual savings per vessel	13,340 EUR
Savings - new building	
Costs for Separator (not necessary)	26,500 EUR
Costs for CJC® Oil Care System	22,100 EUR
Additional savings	4,400 EUR

Application Study

Separator vs. CJC® Oil Care System – comparison field test



Result of CJC® Oil Care: Engine DG#2 - 4,680 Rhs after oil change

ASPHALTENES AND VANADIUM

Within a short time after the oil change, the vanadium content increases rapidly – an indicator that the lubrication oil in engine DG#2 is constantly contaminated with heavy fuel oil (direct leakages of unburnt HFO, blow-by gases). The content of asphaltenes also rises shortly after the oil change but is kept in the uncritical range. Clean oil is able to loosen already deposited asphaltenes from the inside of the engine and to hold them in suspension until these are also filtered out. After a short time the content of asphaltenes is finally drastically reduced. Asphaltenes ingressed from heavy fuel oil are held in suspension in latest lubrication oils. In this case, they are heavily removable for separators.

TBN, TAN AND OXIDATION

The TBN (total base number) used to check the content of alkaline additives drops to a very low level within the first 2,000 RHS as a result of heavy contamination with heavy fuel oil and blow-by gases. The decrease in TBN due to the lower lube oil consumption within the first 3,000 to 5,000 operating hours is typical. It is recommended to exchange 10–15 % of the lubrication oil (here: 20 %). With separators, new oil is refilled due to oil losses, which keeps the TBN stable, but the loss of lubrication oil is exceptionally high.

During the whole test period, the TAN (total acid number) remains stable at a constant low level.

The oxidation level, an indicator for oil degradation processes, rises slightly within > 4,500 RHS but is still at a low level.

VISCOSITY AND SOOT

The continuous contamination with heavy oil has a negative influence on the viscosity of the lubricating oil. CJC® Fine Filter Inserts removes asphaltenes and therefore it will take longer before viscosity reach the threshold limit. Only after > 4,500 RHS does the viscosity reach the limit.

The content of soot and n-pentane insolubles is below the limit values even after > 4,500 RHS.

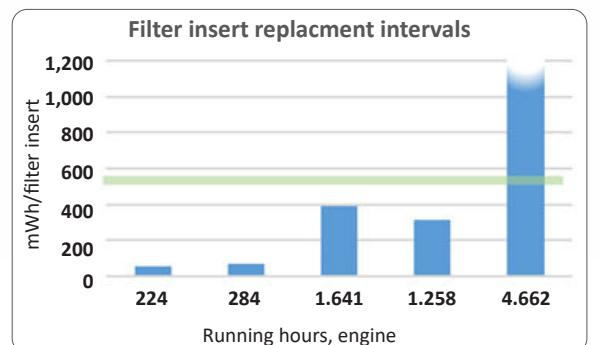
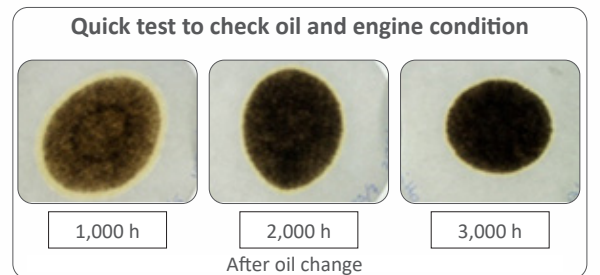
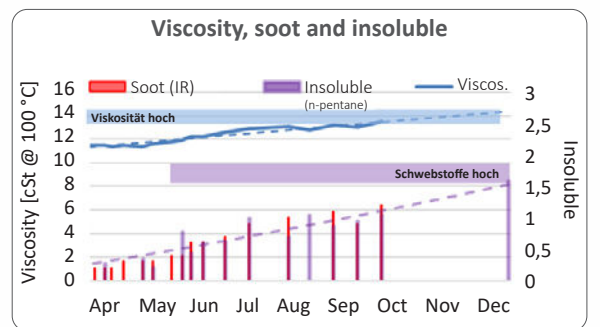
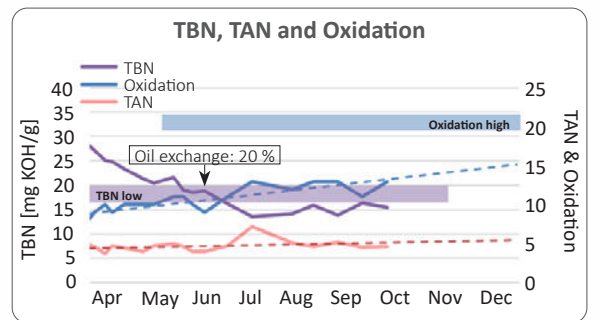
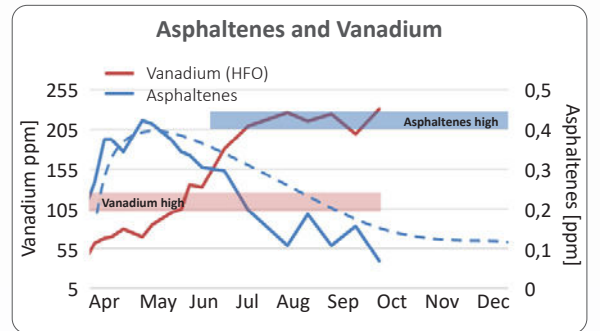
The quick tests for oil and engine analysis show clearly that the lubrication oil has very good dispersibility, i. e. the ability to hold contaminants in suspension.

WATER CONTENT

The lube oil is not loaded with water (condensation, cooling system etc.). In all analysis, the determined water content is within the recommended level.

FILTER INSERT REPLACEMENT INTERVALS

To clean the engine, four filter inserts were used until now. Subsequently, the filter change intervals extended to > 1,100 mWh per filter insert set. CJC® depth filter inserts absorb and adsorb particles (wear, dust), soot/insoluble, asphaltenes, oxidation by-products, water and acid compounds in the depth of the filter material. Due to the unique combination of filtration type and filter material, CJC® depth filter inserts made of cellulose offer extremely high dirt and water holding capacities. The pump of the CJC® Oil Care System enables continuous lubrication oil care (24/7/365).





- worldwide



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History

Founded in 1928 and located in Hamburg, we develop and manufacture CJC® Fine Filter technology since 1951. With substantial know-how and in-house analysis and test facilities we are experts when it comes to the maintenance of oils and fuels.



Quality

Competent advice and individual solutions, even for the most difficult filtration problems of our customers - that is our daily claim. The certification of our company according to DIN EN ISO 9001:2015 provides us with assurance and motivation.

CJC® worldwide

CJC® Fine Filter systems are available worldwide through subsidiaries and distributors. Find your nearest distributor on our website www.cj.de - or give us a call!

