



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

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



Container Vessel, 4,200 TEU
Engines MaK 6M332, 2,880 kW



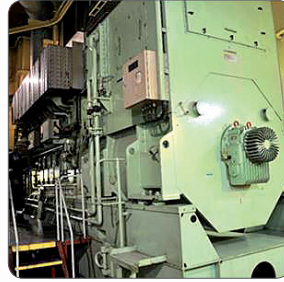


Application Study

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

Engines

Vessel: Container vessel, 4,200 TEU
Engines: MaK 6M332, 2,880 kW/600 rpm
Running hours: 5.300 RHs/year
Load: Ø 60%, long periods with < 30%
Lube oil: 2,250 litres SHELL ARGINA X 40 (0.8 l/kWh)
Fuel: 70% HFO 380–700 cSt, Sulphur: 2,5–3,5 %
 30% MDO or LSHFO 80 cSt, Sulphur: < 0,1 %



4-stroke engine MaK 6M332



CJC® Oil Care System 3x27/108

Test: Separator vs. CJC® Oil Care System

Test period: 17 months
Running hours: 7,880 RHs
Start of test: at approx. 25,000 RHs
Last revision: 13,300 RHs ago at test end

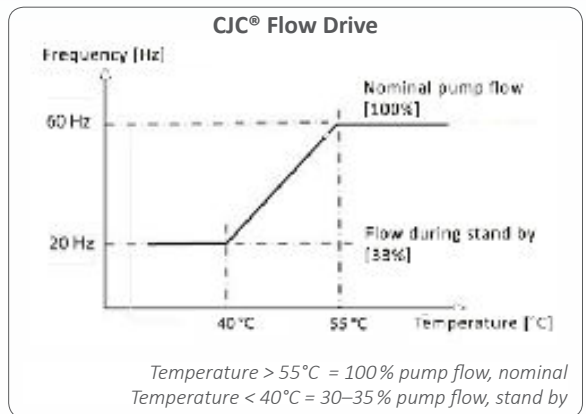
Conventional lubrication oil treatment:

One separator for two engines (DG#1 and DG#2) 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 3x27/108 for continuous fine filtration and drying (24/7/365) was installed on engine DG#1. The automatic temperature controlled flow ensures optimum operation and the highest filtration efficiency.

Pump flow: 1,680 L/h (0.58 l/kWh) nominal,
 end of the test: 840 L/h (0.29 l/kWh)



Specific Lube Oil Consumption (SLOC)

	Engine DG#2 w. separator	Engine DG#1 w. CJC® Oil Care System
Running hours	1,868 h	7,785 h
Oil consumption	3,450 L	6,350 L
SLOC _{MCR} *	0.56 g/kWh _{MCR}	0.25 g/kWh _{MCR}

OEM specifications: SLOC_{MCR} = 0.6 g/kWh (+/- 0.3)

* MCR = Maximum Continuous Rating

Result



>>> 50–60% LOWER LUBE OIL CONSUMPTION ≈ 5.465 L/YEAR
 The specific lube oil consumption of the trial engine with installed CJC® Oil Care System amounts to 0.25 g/kWh – the engine consumes 0.31 g/kWh less than the engine with the separator:

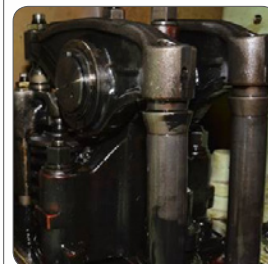
- significant less lube oil losses
- increased engine performance

>>> FEWER DEPOSITS IN ENGINE ROOM
 Dark, black deposits on the surfaces, a mix of asphaltenes and soot, are visibly reduced. The trial engine is much cleaner than the engine with the separator.

>>> GOOD DISPERSANT PROPERTIES, LOW SOOT CONTENT
 The test for quick analyses of oil and engine condition confirms that the lube oil of the trial engine has a lower soot content and better dispersant properties. Improved lubricity and oil properties extend oil lifetime.

>>> LESS SLUDGE
 The centrifugal by-pass filter is inspected every 200–300 hours. During this process the thickness of the sludge layer precipitated in the filters is measured (Ø 5 mm). Approx. 3,000 hours after installation of the CJC® Oil Care System, no sludge in the centrifugal by-pass filter of the trial engine could be detected.

Soot deposits in engine room

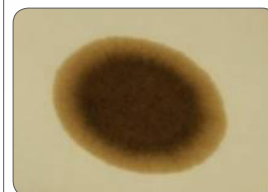


Engine DG#2 with separator

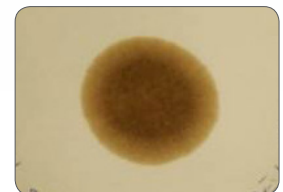


Engine DG#1 with CJC®

Quick test for checking oil and engine condition



Engine DG#2 with separator



Engine DG#1 with CJC®

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



Results of CJC® Oil Care – after 7,880 RHs

ASPHALTENES AND VANADIUM

Despite continuous contamination of the lubrication oil with heavy fuel oil due to leakages in the fuel oil system or blow-by gases (indicator: increasing vanadium content), the content of asphaltenes decreases and is kept within the uncritical range. In latest lubrication oils asphaltenes from heavy fuel oil are held in suspension. In this case, they are heavily removable for separators.

TBN, TAN AND OXIDATION

The TBN (total base number) reserve, which is used to check the content of alkaline additives, drops as a result of the 50–60 % lower lube oil consumption and the lower amount of topped-up oil and new additives but is not critical.

The TAN (total acid number) is consistently kept at a low level throughout the test period.

The oxidation as an indicator for oil degradation increases but remains at a low level even after 7,880 running hours.

** The decrease in TBN (total base number) due to the lower consumption of lubrication oil within the first 3,000 to 5,000 running hours is typical. A controlled oil replenishment is an appropriate method for maintenance of the lube oil especially when based on the regular oil reports. It is recommended never to change more than 10-15 % of the lube oil tank volume. With centrifuges, new oil is regularly replenished due to oil losses, which also keeps the TBN stable, but the consumption of lube oil is exceptionally high.*

VISCOSITY AND SOOT

Despite contamination from heavy fuel oil and low oil replenishment, the viscosity is maintained well below the condemning limit throughout the trial period.

The content of soot and n-heptane insolubles is kept low - > 50 % lower as in the lube oil of the engine DG#2.

Engine DG#2 with separator: 0,4465 % (DIN 51592)

Test engine DG#1 with CJC® Oil Care System: 0,1874 % (DIN 51592)

** Oxidation and degradation products, asphaltenes, soot, wear particles, sand etc..*

WATER CONTENT

The water content in the lube oil of the trial engine is < 0.1 % / 1,000 ppm throughout the trial period.

ADDITIVES

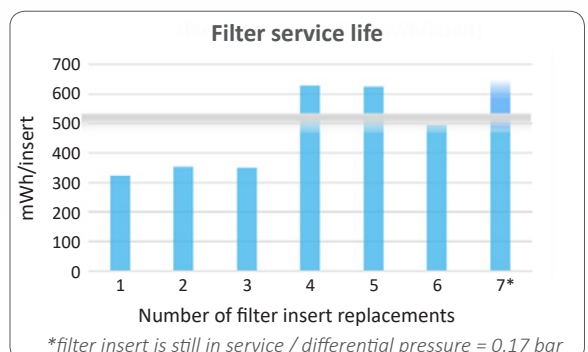
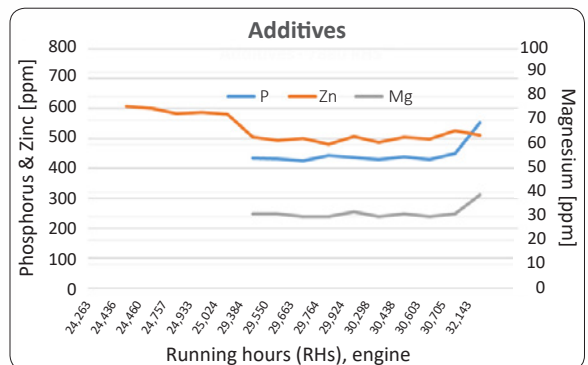
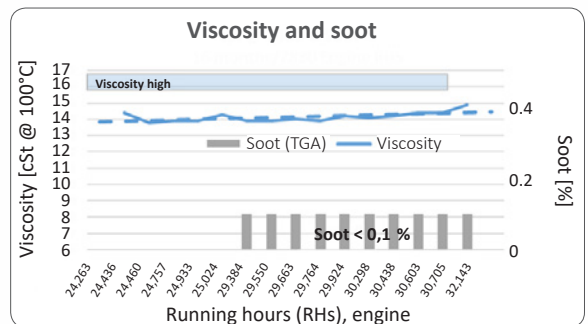
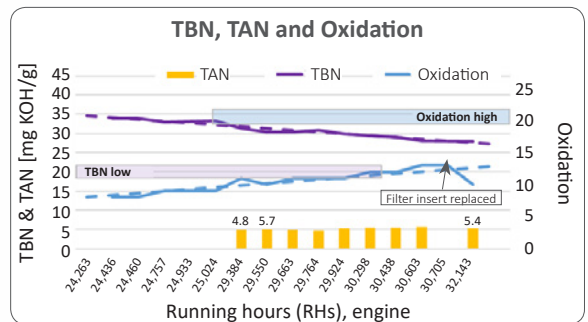
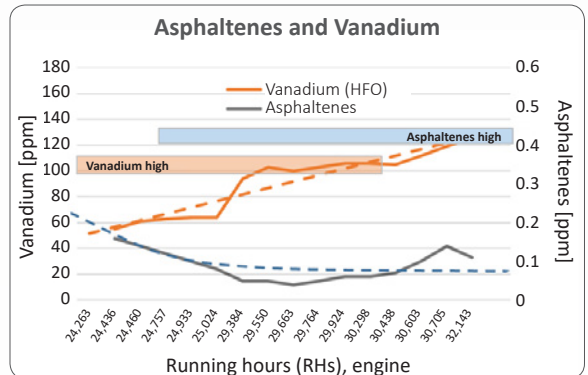
The fine filtration and oil care with CJC® do not affect the additive package despite less oil and additive replenishment due to the lower lube oil consumption.

FILTER INSERT LIFETIME

After the clean-up period, the filter insert service life is expected to be more than 550 mWh/insert.

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).



*filter insert is still in service / differential pressure = 0.17 bar



- 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.cjc.de - or give us a call!

