



## Cleaning fuel - Do It the Danish Way

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The options for cleaning fuel in fishing vessels are many and often not easy to distinguish between as the functional principles, the efficiency and the economical achievements of the systems available are so different that it is like comparing apples with pears.

Danish oil care equipment manufacturer C.C.Jensen A/S has 50 years' experience in cleaning fuel on fishing vessels and has around 90% of the Danish vessels as a guarantee for an efficient and reliable product. In the past 5 -10 years the product has been exported to skippers from Iceland to Chile and in the Scottish fishing industry skippers are now retrofitting the system on existing vessels in high numbers.

The following is a general description of the various parameters that has to be considered when looking for equipment to clean diesel fuel.

The first fuel filter we meet in the vessel is the in-line spin-on filters on the engine. These filters are supplied with the engine and is usually filtering the fuel between the engine fuel feeding pump and the injection nozzles. The fineness of these filters varies from 10 to 25 micron and they are always pleated surface filters with very low dirt holding capacity.

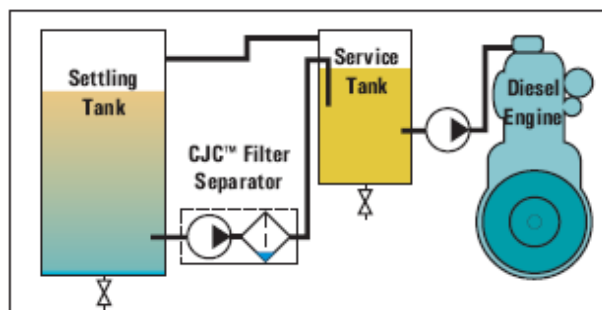
The fineness of 10 to 25 micron will result in removal of up to 10% of the particles in the fuel. The reason is as an analysis of the distribution of particle sizes in diesel fuel shows, that only 10% of the particles are larger than 10 micron.

Hence, the small particles, <10 micron, constitutes up to 90% of the particle contamination in the oil. Usually tolerances in feeding pumps and nozzles are much smaller than 10 micron and the particles fitting into these tolerances are those creating the wear and tear and in worst case an immediate breakdown. So if you frequently change nozzles on the engine one reason could be that your fuel cleaning system is not removing the small particles.

Some engine manufacturers recommend to have a filter and water removing system in the line straight from the tank into the engine. The reason is that water often accumulating in tanks and therefore will seal nozzles and wear down feeding pumps when entering the suction system. However, if the equipment is installed like that it is impossible to have efficient cleaning and at the same time high dirt holding capacity. This will inevitably result in very frequent changes of elements and thus high maintenance costs.

Based on experiences and tests it is recommended to install fuel filtration and water removal between settling tank and service tank as illustrated below.

Illustration of installation principle



With this installation principle you achieve continuous cleaning of the fuel even when the engine is not running. With an overflow back from service tank to settling tank this will ensure permanently dry and clean tanks as well as clean fuel.

However, the most important reason for this installation principle is the fact that fishing vessels very often are exposed to bacteria, yeast, moulds and fungi development in fuel tank systems. Entering through air vents and other tank openings, they are always present in the fuel, normally without causing problems. However, if the bacteria and fungi are allowed to multiply and reproduce the problem can rapidly turn out to be severe.

To multiply bacteria needs water, nutrients such as sulphate and nitrate and temperatures between 10 and 25°C.

Bacteria will not only result in inside out corrosion in tanks, but also in a glutinous form of sludge from dead cells in the bottom of the tank. If water is not removed from the tanks regularly and the vessel is exposed to heavy swell and rolling, these dead cells will be disturbed and carried over in the fuel injection system. The low dirt holding capacity of the full flow filters between day tank and engine means that these will block immediately and fuel supply to the engine be cut off. If a by-pass is installed the sludge will be introduced into the engine, and feeding pumps and nozzles will breakdown. Several instances have been reported where vessels entering a harbour with tough waters have had an instant fuel cut due to bugs or water contamination. In some cases the skippers were not able to restart before the next wave at high force slammed the vessel into the quay.

Traditional centrifugal separators are installed as feeding pump between settling tank and service tank, however there is no comparison to a CJC Filter Separator. Centrifugal separators are cleaning by means of centrifugal force. This means that the efficiency is dependent on the flow, the time the oil spends inside the bowl, and the mass of the contamination. If the specific weight of the contamination is less or the same as the oil the contamination will pass through the centrifugal separator.

The CJC Filter Separator is a mechanical filter retaining 98.7% of all particles >3 micron in one pass. Furthermore 50% of all particles >0.8 micron are removed in one pass.



The CJC Filter Separator is additionally separating water by coalescing, which basic technique is speeding up the natural settling process of water in oil. The equipment is able to remove up to 20% water in the oil in one pass.

Hence the CJC Filter Separator is a preferred alternative to centrifuges and purifiers as it offers more reliable operation and less maintenance. The CJC Filter Separator has, contrary to centrifuges, only one spinning part in a very reliable gear wheel pump. It requires no adjustments during operation and the filter inserts are changed 2 - 3 times per year.

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