

EN590-certified fuel

- no guarantee for reliable tug operation

Fuel is often not as clean as you might think. Although the EN590 standard determines the acceptable fuel contamination level in mg/kg and water content in ppm, tugboats using EN590-certified fuel still risk breakdown from contamination.

That's because EN590 does not specify how the remaining, "acceptable" contamination is distributed in the fuel by particle size distribution, says Marco van Boven, C.C.JENSEN filtration expert and Area Sales Manager Marine Benelux.

Therefore, a low mg/kg level can still indicate a high number of very small particles of contamination in the fuel.

"These particles accelerate wear and tear, often resulting in injector leakage or pump damage. Water contamination, which includes water ingress from condensation, can also cause bacteria growth, causing blockages of filters and injectors as well as creating corrosion and cavitation – ultimately, jeopardizing uptime," says van Boven.

However, there is more to consider. As a by-product of the refining process and a natural consequence of the fuel degradation processes modern diesel, contain asphaltenes, paraffins and resin. These are commonly known as organic debris, but in daily language referred to as tar/asphalt, wax, sludge and diesel bugs. Most of the organic debris are acidic and will cause corrosion of injectors, pumps and tanks. It will block your injectors, affect combustion and eventually clog in-line filters. In short, it will ruin your engine

What's more, he adds, in the supply chain there exist the risk that various batches of fuel are mixed, meaning that sometimes the fuel itself is not even in strict accordance with the EN590 standard.

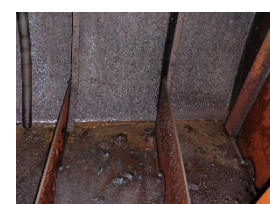
We noticed an increased usage of ultra-low sulphur diesel. Due to the refining process, the ultra-low sulphur diesel has less lubricity efficiency. Lubrication is essential to reduce friction in components like pumps, injectors and valves. This means even higher requirements for clean diesel fuel.



*Wear on injector
- risk of leakage*



*Bacteria growth
- risk of blockage of filters*



*Condensation in fuel
storage tank
- risk of engine breakdown*



What can go wrong where?

Poor quality fuel can have undesirable consequences related to virtually every aspect of an on-board fuel system.

When the tug receives new fuel, for example, the unknown distribution of small and large particle sizes creates the risk of a high contamination level. New fuel can also be contaminated with water. Such risks carry over to fuel storage as well.

As fuel degrades due to the presence of water, asphaltenes and contamination, the risk of bacteria growth in tanks increases. Tanks, pipelines, injectors and filters can all get blocked with diesel bacteria sludge.

Water/contamination in fuel can corrode system components, cause cavitation in fuel pumps, wear on injector seats and promote microbial growth.

Moreover, in worst-case scenario, engine uptime and tug operation are jeopardized by leakage/blockage of injectors, damage to the fuel pump and block fuel filters – all because of bad quality fuel.

What causes water contamination?

The primary cause of water contamination in a diesel fuel storage system is condensation.

“Fuel tanks will breathe in moisture-laden air, and changes in ambient temperature will cause water to accumulate on the inside walls of the tank. Sudden drops in air temperature cause rapid condensation,” van Boven explains.

Often, water problems can occur right after a fuel delivery.

He adds: “The problems may not stem only from receiving wet fuel during the delivery, but may be attributed to previous water accumulation that settles in the bottom of a tank and is then kicked up and mixed with the new fuel during the delivery process.”

Continuous fuel circulation - the most effective solution

The most effective way to prevent potential problems is to introduce continuous fuel filtration and separation, van Boven asserts .

Forced circulation of fuel in tanks through a CJC™ PTU Filter Separator ensures that ingressed water contamination is continuously removed.

The CJC™ PTU Filter Separators from C.C.JENSEN have a filtration degree of 3 microns and highly efficient coalescing system to separate water from fuel. This keeps diesel clean and free from water in the settling and day tanks and



increases engine reliability. The PTU product line is easy to service and does not require sludge tanks, he says. In addition, the products are installed offline, meaning they are non-system critical – that is, machinery shutdown is not necessary when changing the CJC™ Filter Insert.

Other benefits include increasing equipment lifetime and reducing maintenance costs.

ROI in less than 12 months

The modular CJC™ PTU Filter Separators are built and sized to specific customer requirements. “The exact results are very different from case to case, since there are many different parameters that can affect outcome,” van Boven explains. “But in 98% of the projects we work on, return on investment is less than 12 months.”

Tug owners and operators, MROs and shipyards all benefit from CJC™ PTU-technology, according to van Boven.

How tug owners/operators benefit

With the CJC™ PTU-technology, tugboat owners and operators can:

- Extend lifetime of engine components
(avoid blockage of injectors, avoid damage on fuel pumps)
- Avoid bacteria growth
(no sludge in tanks; no blockage of filters/pipelines)
- Ensure uptime with clean & dry fuel
- Retrofit the plug-and-play CJC™ solution or install in new vessels
- Easy service the CJC™ PTU Filter Separator & easy Filter insert change

How MROs benefit

With PTU technology, Maintenance, Repair and Overhaul operations can:

- Install the plug-and-play CJC™ solution easily on existing vessels
- Support customers through reduced OPEX
- Improve customers' uptime

How shipyards benefit

With PTU technology, shipyards can:

- Lower the cost of fuel systems
- Eliminate the need for fuel sludge tanks
- Provide customers with tugboats that create additional value

Centrifuges vs. CJC™ PTU Fuel Filter separation

Although some tugboats try to combat such problems with centrifuges, fuel filter performance of centrifuges is typically 5-6 microns, which is not good enough to protect the injectors, says van Boven.



“Centrifuges also require a sludge tank and skilled people to service them – they’re not nearly as easy to service as the CJC™ PTU. In fact, we offer the lowest cost per kilogram of contamination removed, and our CJC™ PTU’s removal of water from fuel is continuous,” he says.

Furthermore, we witness situations with centrifuges who typically do not separate the water level below 200 ppm.

Fuel Filters with pleated filter media are not enough

A pleated fuel filter is the last chance to protect the engine, cautions van Boven.

“It shouldn’t act as a work filter. Given its location and limited capacity, it cannot keep the entire fuel system in good condition. It is also extremely expensive per kilo of contamination removed. Our CJC™ PTU has the lowest cost per kilo, while pleated fuel filters have the highest.”

In addition, the pleated filter’s limited filter area is blocked rapidly by contamination and sludge products from bacteria growth.

Find out how to meet your fuel cleanliness and water level targets by contacting Mr. Marco van Boven, Global Key Account Manager, C.C.JENSEN Benelux, [m vb.nl@cjc.dk](mailto:mvb.nl@cjc.dk).

For more information, see: <https://www.cjc.dk/system-solutions/marine-offshore/tugs/>

C.C.JENSEN is the global leader in fuel and oil maintenance, with over 65 years of experience in the marine and offshore industry.



*CJC™ Filter Separator
- keeps your tug fuel
clean and dry*