

# 'Diesel Doctor' - 2015 - The Year of the Bug

Gone are the days of filling up your tank and forgetting about it.

No the Year of the Bug, isn't a new edition to the Chinese zodiac, rather it's what we can expect with the onset of the new emissions regulations that came in to force on the 1st January this year.

## What are the new requirements?

From now on ships trading in designated emission control areas will have to use fuel oil on board with a sulphur content no greater than 0.10%. Considering how many people contacted us last year with fuel issues when the allowed amount of sulphur was a whole 1.00% it's evident that this is going to be the year of the Diesel Bug and other such complications.

## What are the implications of Low Sulphur Fuel?

Everyone agrees and understands the need to move to low sulphur fuels; however, losing the sulphur from fuel will impact in three key areas:-

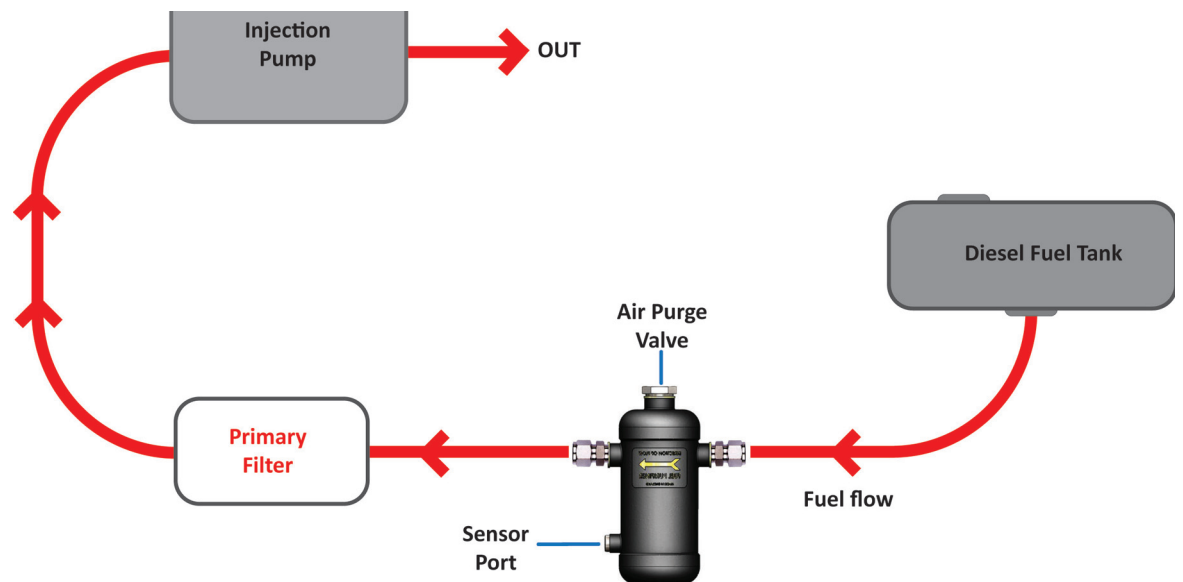
- Contaminants
- Deposit Control
- Lack of Lubricity

## Contaminants – aka – Diesel Bug

Diesel Bug is the collective name for the microscopic fungi, yeast and bacteria that are present in fuel, as diesel is an organic fuel these will always be present. The problem starts with water contamination in fuel.

There are many different reasons why fuel contains water for example from absorption, the supplier or condensation, but be assured all fuel contains some water. Diesel bugs attach themselves to the water droplets and sink to the bottom of the tank where they feed from the fuel above. They double in number every 20 minutes, living for 18 hours they excrete waste and die leaving the all too common sludge at the bottom of the tank.

Not only does this sludge clog filters and stop the engine it can also corrode steel tanks, so look out for the tell-tale signs of pitting, corrosion and the smell of rotten eggs which indicate a serious problem. Sulphur is a natural biocide and its removal



has is leading to a proliferation of Diesel Bug as vessels tie up alongside for even only a few days.

## Deposit Control

Along with traditional coking commonly found on the injector tip and spray holes, the advent of low sulphur diesel has introduced internal diesel injector deposits (IDID) which have been found within the injector body. There are two types of deposits found, 'waxy' or 'soap' like deposits and carbonaceous or lacquered.

These deposits can slow the response of the fuel injector or cause sticking of the internal parts. This in turn can result in loss of control of the injection event timing as well as the quantity of the fuel delivered, both of which will impact on how the engine performs. A build-up of these deposits can lead to rough engine running.

The injector is at the forefront of these changes and is at the heart of fuel optimisation. Older engines with greater tolerances are less likely to be affected but modern injection systems are much more likely to rely on extremely high pressure common rail systems with progressively smaller holes, holes of which in some systems are smaller than a human hair.

The tolerances between the moving parts are now exceptionally fine, often just a few microns and IDID issues have reportedly developed in as little as 100 hours and in other cases engines that operate perfectly at the end of the working day

experience issues only when next started.

## Lack of Lubricity

All diesel injection equipment has some reliance on fuel as a lubricant, especially for rotary and distributor type fuel injection pumps as found in today's modern common rail injection systems. Fuel refiners have had to develop new technologies to remove the sulphur while not losing performance and power or the end user. The most effective way to remove sulphur is through a process called hydro-processing. During this process the sulphur in the fuel is removed and replaced by hydrogen resulting in a cleaner burning fuel with improved performance.

Unfortunately as hydrogen is a highly reactive element and increases the likelihood of IDID, it also reacts with other components in the fuel removing the polar and aromatic compounds that provide conventional diesel fuel with adequate lubricating capabilities. As with the deposit control issue, the tolerances are so very fine between the moving parts, that this lack of lubricity can easily cause higher wear and scarring, ultimately shortening component life.

## How can you safeguard your engine against the effects low sulphur fuel?

There are probably as many options as there are fishing boats and it is very easy to get swamped by all the information out there. Given the lubricity and deposit issues caused by low sulphur diesel we would

recommend that everyone has a robust additive programme that offers your engine the best protection – especially if you are operating a modern common rail system. The important thing here is to see behind the hype and get a reliable product tailored for the appropriate issues.

## What about the Dreaded Diesel Bug?

There is only one sure fire way to ensure that you do not have issues with Diesel Bug and that is simple - remove the water from the fuel. There are additives available that will kill Diesel Bug, but they will only deal with the fuel you dose at the time you dose, so next time you fill up you have a whole new tank of fuel with some water and of course in winter boats are often tied up and condensation creeps into the tank adding even more water all of the time.

The best way to tackle all three issues to install a Fuel Purifier to remove the water which will ensure Diesel Bug is not an issue and then regularly dose with a credible additive that contains a little biocide along with an added lubricant and cleaner to minimise the risk of deposit build up.

MarShip UK specialise in maintaining the vital elements of your engine – Oil, Fuel and Air. In this regular feature they aim to address any fuel related issues faced by the fishing community. Exhibiting at all 3 Skipper Exhibitions so please take the opportunity to visit their stand. If you have a question or experience to share please contact them sales@marship.eu or call us on Tel: +44 (0)845 287 1546