



## **MICROBIOLOGICAL CONTAMINATION IN DIESEL FUELS**

Microbiological contamination occurs predominantly in distillate fuels, with kerosene, diesel and gas oil being the most commonly affected. The contamination is caused by the growth of microbiological organisms, which live in water but are able to feed on the fuel. The three major types of organisms are filamentous fungi, yeasts, and bacteria.

The potential for microbiological activity is always present in oil fuels but the spores can remain dormant until the environmental conditions become favourable.

Infestations are commonly caused by organisms living in water that has accumulated at the bottom of a storage tank. The organisms concentrate at the water-fuel interface where they can live in the water and feed off the fuel.

Growth can be maintained within acceptable levels if free water is kept to a minimum. Regular tank draining is absolutely essential and can save a lot of trouble later on. Water can be removed by draining from the sludge valve located at the floor of the tank.

Ideally this should be done when the tank contents are well settled or before the next delivery is expected. It is advisable however to regularly (weekly) check for water and drain if required at least once monthly. This can be relaxed once the trend of contamination level is established.

Water can accumulate in storage due to changes in the ambient temperature around the tank for example warm days and cool nights.

Small quantities of condensation will form on the tank sides in the header space over the fuel. This in turn can create water droplets, which can accumulate on the tank bottom as free water or stimulate the growth of biofilm as it runs down the tank sides.

If free water is present in quantities of >0.05%, based on tank volume, growth can continue undetected for quite long periods. The first symptom is usually some form of filter blockage, which is caused either by the sheer biomass of the organisms or the by-products that they produce (e.g. slimes). This often occurs after the fuel has been stirred up for some reason, e.g. after a fuel delivery.

In cases where microbiological contamination is suspected, samples of fuel, water and blocked filters should be taken and professional advice sought.

All fuel dispensing systems require filtration to protect the end user / appliance. The filter should be installed inline between the storage tank and the appliance / pump. This filter needs to be checked at regular intervals for accumulated dirt / sediment and any dirt / sediment must be removed before replacing the filter unit. The pump manufacturer should install the correct filter type and size depending on the fuel in use.

If heavy microbiological contamination is confirmed, one practical course of action is to clean the tank out. The size of the tank will dictate the method to be used. The tank should be completely drained and all contamination removed. This could involve high-pressure water washing the internal surfaces of the tank to remove biofilm and spores.

In many cases cleaning followed by regular tank draining to prevent further water accumulation should be sufficient to remedy the problems. However in cases where there is some doubt (e.g. where it has been difficult to thoroughly clean the tank), it may be necessary to use a biocide treatment.

Biocides are added to the tank before filling with fresh fuel after the tank has been cleaned. The biocides are toxic and we advise that specialist contractor's carry out the treatment.