



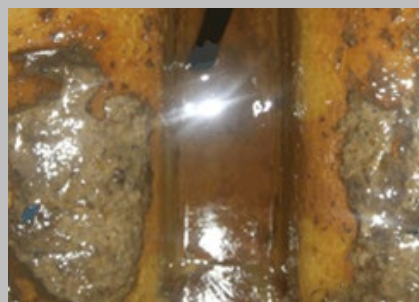
CASE STUDY – GROTAMAR® 71 AS A BIOCIDES FOR TREATMENT OF DIESEL STORAGE TANKS

BACKGROUND

Diesel fuel contamination

Water physically dissolves in fuel, particularly in warm, humid conditions. This water will separate out of the fuel when it cools down. Humidity from air in the tank (headspace) may condense when temperatures drop below the dew point. The free water collects on the tank's bottom or may form droplets or liquid layers on the tank's walls and in fuel lines.

If conditions are favourable and free water is available microorganisms can multiply exponentially. The formation of slime and heavy bio-sludge is the result of their metabolism. Bio-sludge can cause engine failure or damage as a result of filter and injector blockage. Microbes can also cause rapid and severe corrosion of tanks and fuel system components.



Biofilm in a storage tank



Microbial corrosion in a tank



Microbial contamination causes major system failures. Microbes need very little free water to grow. In practice there is often sufficient water in the bottom of tanks, pipelines and equipment or as condensate films on tank surfaces. When they grow in terminal storage tanks they may get carried along the fuel distribution chain to contaminate downstream facilities and end-user tanks. The major problems caused by microbial contamination are spoilage, fouling and corrosion which results in failures like:



Fuel fouled by microbial slimes can fail filtration tests. Microbially formed bio-surfactants can stimulate the suspension of water in fuels and oils causing them to become hazy and causing failure of filter water separators.

❖ **Excessive wear of system components and engine failure**

Fouling by slimes produced by bacteria, yeasts and moulds can cause severe filter plugging, blocking of fuel and oil lines and injectors and consequently cause excessive wear and failure of engines and system components.

❖ **Alteration of product properties (specifications)**

Microbes can grow in fuel causing depletion of additives, increased acidity and loss of functional properties.

❖ **Pitting Corrosion in tanks**

In steel and aluminium storage tanks, growth of bacteria (i.e. Sulphate Reducing Bacteria, SRB) can cause pitting corrosion which can proceed at rates of over 10mm per annum.

❖ **H2S formation**

Growth of SRB in fuel tanks can cause sulphide spoilage of fuels. The fuel becomes corrosive and can fail specification.

CHALLENGE

- Blocking of filters and pumps
- Engine failure
- Loss of function
- Pitting corrosion in storage tanks
- Out of spec

SOLUTION

- Biocide with good partition between fuel and water phase
- MBO is efficient at low dosage

RESULT

- Successful sanitation of contaminated fuel tanks or preventative treatment

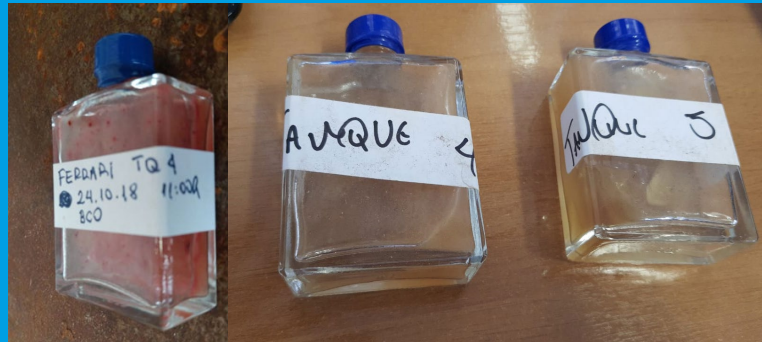


Scenario A1

Brazil market- São Paulo
 Preservation of diesel stored in tanks
 16 – 30 m3 used to supply vehicles
 and plant equipment.
 Identified problem: constant cases of
 power loss in vehicles and equipment
 (tractors mainly), which sometimes
 stop working due to blocking of
 injection systems, such as pipes,
 filters, etc.

- ✓ Shock Treatment 1000 ppm
 grotamar® 71
 (30 L / 30 m3 diesel)
- ✓ Preventative treatment 100 ppm
 grotamar® 71 by each filling of the
 tank

Monitoring at the field with microcount fuel:



Before treatment

After Treatment

- ✓ Support with Best Practice Housekeeping
- ✓ The results of the microbial evaluation
 confirm the suitability of grotamar®71 as a
 fuel biocide.

Scenario A2

Brazil market
 Oil platform in Campos Basin in
 Brazil
 Sanitation of diesel storage tanks on
 an offshore oil platform.

- ✓ Treatment of 400m3 diesel / 0,8%
 water emulsified
- ✓ Shock Treatment 500 ppm
 grotamar® 71 (200 L / 400m3
 diesel)
- ✓ Preventative treatment
 recommended

Monitoring at the field with microcount fuel:



Before treatment

After Treatment

- ✓ The results of the microbial evaluation
 confirm the suitability of grotamar®71
 as a fuel biocide.