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Bio Fuel Storage Issues

Document gives a very brief insight into the issues of bio-fuel storage today and the cause of tank and pump infrastructure contamination.

Please contact JSM Developments Ltd for more information and thank you for reading.

Bio-Fuel Storage Issues

The UK Renewable Transport Fuel Obligation Programme, from April 2008, placed an obligation on fuel suppliers to ensure that an increasing percentage of their aggregate sales are made up of bio-fuels. Rapid introduction of unleaded petrol (E5) and diesel (B5) is now being seen

Major fuel suppliers are now introducing bio-ethanol blends into their fuel distribution networks on a large scale.

Whilst there has been considerable focus on the operational and technical challenges presented by the introduction of bio-ethanol into fuel, there has been much less focus on the issues surrounding the storage of such fuels and the effect on retailers.

Microbes degrade bio-fuel rapidly; some estimates put degradation rates at double those seen from the older conventional fuels. This is potentially a good prospect in terms of the impact on the environment in the event of fuel spills, but there are significant implications for the stability of Bio-fuels in storage. Wherever water is present in storage, even in small amounts, microbial growth can be promoted. The resultant biomass produced can lead to serious fuel quality problems, infrastructure deterioration, sludge formation, and corrosion of tanks and pipework.

Characteristics of Fuel

Fuel contains carbon molecular chains and refiners introduce additives such as chelating agents, detergents, lubricants and corrosion inhibitors, which over time eventually become a natural nutrient source for microorganisms growth.

Contamination in Storage Tanks

Even in the best-maintained tank, microbial contamination is a known problem and the essential element for microbiological growth is water.

Sources of water can be:-

Water that is dissolved in the fuel will condense on tank walls.

Moisture in the air can enter through vents or poorly fitting tank lids.

Poorly designed tanks that do not drain properly allow water to remain in the bottom.

Newly delivered fuel with higher than average water content.

Even today's allowable amount of moisture is enough to start a microbiological colony growing and fermenting.

The resulting cell metabolism then produces more water and the cycle of generation continues. Since oxygen is usually present, all ingredients needed for rapid microbiological growth are present including the carbon source.

The creation of life and evolution is:

Bacteria + Water + Oxygen

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More Bacteria + Carbon Dioxide + More water

Problems Caused by Microbial Growth

Microbial contamination will contribute to aging instability and integrity of the fuel, but by far the most serious damage is done by microbially induced corrosion of the storage tanks and pipe infrastructure. Additionally diesel microbe growth

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causes the formation of thick “jelly fish” like microbial mats that block filters and pipelines and significantly increases wear on pumps and motors.

Even if oxygen was not present sulfur-reducing bacteria (SRB) continue to thrive and corrode tank material. It is best to keep the water content below 50 wppm.

Biocide Treatments

It is possible to kill the microbe growth with biocide treatments and there are a number of expensive biocides on the market, which must be handled very carefully.

Usually if a biocide is used, it must be added every time a tank is refilled until the problem is fully resolved.

Biocides attack the cell wall of microbes resulting in lysis, the death of a cell by bursting. Unfortunately the dead cells then gather on the bottom of the fuel tanks and form additional sludge that will continue to block filters and delivery infrastructure unless fully removed.

Unfortunately if the right conditions continue, microbes will repopulate the tanks, and re-treatment with biocides will be necessary. With repetitive biocide treatments, microbes can form resistance to a particular brand. Trying another brand of biocide with another antibiotic may resolve the problem, but it's a continuing and expensive process.

Revolutionary New Treatment

JSM Developments Ltd has devised a totally new cost effective process to remove the risks associated with Bio-fuel storage.

The Bio Bug Buster is a programme of services tailored to guarantee the integrity of your stored fuel.

For more information please visit the JSM web site:

www.jsmddevelopments.com

Or contact us directly:

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