

>> DIHYDROGEN OXIDE THREAT TO DIESEL ENGINES - By Dave Scott

It's nothing new – dihydrogen oxide is simply H₂O - water. But it's disastrous in modern diesel engines if it gets past filters and water traps and into common rail injection systems where pressures run from 1600 up to 2000 bar.

So what gets damaged in a diesel engine? Any diesel engine suffers damage to all its injection equipment, but the problem is compounded in electronically-managed, common-rail or unit injector diesel engines. These engines typically need fuel pre-filtration down to 3-micron and corrosion particles that H₂O generate will cause injectors to stick, resulting in over-fuelling and burnt pistons as well. Every truck owner will tell you that premature fuel injection equipment failure is horrendously expensive.

The problem does not end there. Water in fuel promotes the existence of fungus and bacteria that live in the water while feeding off hydrocarbons found in fuel. These contaminants are called Hydrocarbon Utilizing Micro-organisms, or go by the acronym of HUMbugs – they even eat steel! A microbial problem is evident when the spores become active and multiply, forming colonies and mats of growth. Colonies then spread through the fuel system wherever moisture (or even trace amounts of moisture), is (and are) present.

Bacterial problems in fuel are characterised by shorter fuel filter life, evidenced through black slime over the entire filter media surface. Draining fuel systems reduces microbial activity but does not eliminate it. Lab tests will confirm the presence of HUMbugs. Once microbial activity has started in a diesel fuel system, the only way to eliminate it is to treat the system with a biocide. Biocides are extremely hazardous substances and should be used only in consultation with your fuel supplier.

Even in desert climates water is a problem in diesel storage tanks through condensation, especially in above ground BTF (bulk-to-farmer) tanks that are subject to a very wide ambient temperature range between day and night. Water ingress

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through condensation is a universal problem – as bulk storage tanks must breath, condensation is magnified during seasonal rainfall and in humid areas. Condensation forms in an empty diesel fuel tank at night with the temperature drop. So it really is worth filling fuel tanks when parking vehicles overnight.

There are, however, other ways that water finds its way into diesel fuel:

- Breather pipes are often open to the atmosphere for rainwater to enter.
- Underground tanks leak. Continuous appearance of water in fuel requires a pressure test to determine if the tank has a hole that is allowing ground water ingress.
- Sometimes petrol may be water-contaminated on delivery. The contamination can be accidental or fraudulent. Allow sufficient time for the fuel to settle (\pm 2 hours) and then check with water-finding paste after each delivery to make sure that water is not in the bottom of the tank.
- Many storage tanks have either poorly sealing or missing caps. Caps must be inspected regularly to ensure that they are securely fitted and that seals have not broken or perished.
- Storm water drainage surrounding fuel pumps may be blocked, resulting in flooding of fuel delivery manholes.

Bulk fuel storage must be regularly tested with water-finding paste. And then even check that the paste is reacting to water by testing the paste prior to applying the paste to a tank dipstick – it's hygroscopic and neutralises with age.

The last word goes to Isuzu Truck Engineer, Frans Schellingerhout, a victim of highly contaminated diesel fuel when recently collecting a new Isuzu truck from the Durban docks. After filling the tank, the truck came to a spluttering halt only 350m from a Caltex Mobeni filling station. The whole experience was repeated 300km later to prove that not all the contamination had been removed. Says Schellingerhout: "I must warn truckers against unscrupulous filling station outlets which do not care a hoot about a trucker's fate. And then be careful about your choice of filling station outlets, specifically after recent rain storms. Underground tanks often become reservoirs of excess water."

It's not as though fuel contamination is reserved for one vehicle in a fleet of trucks – the whole fleet can be brought to a grinding standstill. The evidence is excessive white exhaust smoke, engine misfire, erratic idling and power loss. Remember, it's not just the damage - it's the lost productivity through downtime that piles on the losses. Just keep dihydrogen oxide away from diesel – it costs too much!