Fuel Sampling for Bacteria, Water, Particulates, Fungus

A highly contaminated sample of diesel showing the fuel floating on water with bacterial growth at the interface.

Do you want to risk backup generators, plant equipment or vehicles failing?

Prevention is better than cure, beware of the "diesel bug"!

You may have a problem if you:

- Store fuel for more than 6 months
- Have not had your storage systems inspected in a long time
- Operate in places with extremes of weather
- Cannot determine the quality of your fuel as delivered to you

Fuel/Oil sampling can give an early warning of any potential problem and remedial polishing can be cheaper than having to dispose of contaminated supplies.

From January 2011 EN590, the EU's Fuel Directive standard for gas oils was changed and new fuel supplies must have a low sulphur content (below 10ppm) and may contain up to 7% by volume of biodiesel (Fatty Acid Methyl Ester). In practice it can be much higher and it is this that can exascerbate the problem of bacterial/fungal growth. Heavily contaminated fuel supplies can prevent your machinery from operating efficiently and even lead to a total breakdown.

Changes are reflected in the revised edition of the British Standard for gas oil [BS 2869:2010+A1:2011 - Fuel oils for agricultural, domestic and industrial engines and boilers]. The existence of a new grade of gas oil with a significant biodiesel content creates increased possibilities of cross-contamination, wrong product delivery or delivered product not declared as containing biodiesel [although this is a requirement of the revised British Standard].

Problems that can arise

- Material incompatibility - many common rubbers, plastics and surface coatings will degrade from contact with biodiesel
- Residual deposit flushing, causing clogged filters, etc.
- Water uptake, with enhanced potential for mould growth, producing solid matter and acids
- Fuel stability - biodiesel can degrade over time by oxidation and hydrolysis
- Cold flow, waxing and precipitation problems
- Burner and component tolerance of biodiesel and/or its degradation products

"Diesel bug" is not a single species of microbe. The various spores which exist in even the cleanest of fuels can remain undetected until it's too late. As spores grow and die in suitable conditions they lead to the build up of sludge and floating debris which can block filters and injectors.

Andel's fuel/oil sampling and polishing services lower your risk. Do you really want to have to replace degraded fuel or run the risk of emergency, mission-critical equipment not working when needed?

A typical site sampling service (10 tanks) can be completed in one day and our independent labs provide a comprehensive results sheet detailing as standard particle count (bacteria and solids) and water content (sulphur is optional). The tests can demonstrate degraded fuel and tank condition.

If you're in any doubt call us now on 01484 845 000 or email help@andel.co.uk to discuss your options.

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Fuel Polishing - Remediation

If after using our Fuel Sampling service your fuel tests "positive" what can be done?

Fuel suppliers are recommending that stocks older than six months be burnt off and replenished and then used half yearly thereafter.

We do not recommend this course of action because:

- it is environmentally harmful significantly increasing CO2 emissions
- it is not sustainable resulting in a major increase in oil use
- it will significantly increase your fuel budget year on year
- you may well still have residual contamination in your tanks that could then "infect" the new fuel

Andel has been looking after major oil storage facilities for over a decade and has extensive hands on experience in helping clients solve this problem.

We can offer several solutions:

- trade your old fuel in; all oil has a resale value. Although still a costly option and your tanks will still need cleaning, you can at least get a contribution to any new oil you purchase
- remove the contaminated fuel, thoroughly clean your tanks, then "polish" the fuel to an acceptable standard using state of the art remediation equipment, before returning the oil to the "clean" tank
- attach permanent "polishing" systems to your tanks which will regularly circulate the fuel and clean it of any contaminants

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ISO 4406 ISO Solid Contamination Codes

A recent fuel polishing operation for a client totalling around 500,000 litres of oil showing bacterial and water contamination in excess of acceptable standards.

ISO4406: ISO Solid Contamination Code values for this client were as high as 50 where 15 is more the norm.

ISO, the International Organization for Standardization develops and publishes International Standards. ISO4406 defines a code based on the number of particles per unit volume greater than 4, 6 and 14 micrometers in size. Range numbers identify each increment in the particle population throughout the spectrum of levels.

ISO particle counting is an important tool when determining the cleanliness of the oil and level of water present in an oil sample. We use the Karl Fisher test when testing for water and if not determined by Karl Fisher, the particle count will show as a high contamination resulting in a false reading of the value of "PPM" of the oil being sampled.

ISO 4406 Range Number	More than (particles per ml)	Up to and including (particles per ml)
24	80,000	160,000
23	40,000	80,000
22	20,000	40,000
21	10,000	20,000
20	5,000	10,000
19	2,500	5,000
18	1,300	2,500
17	640	1,300
16	320	640
15	160	320
14	80	160
13	40	80
12	20	40
11	10	20
10	5	10
9	2.5	5
8	1.3	2.5
7	0.64	1.3
6	0.32	0.64
5	0.16	0.32
ISO 11171 ISO 4406:1999 R4/R6/R14		

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