



## **COMMON DIESEL FUEL PROBLEMS NUMBER 3 - FILTER BLOCKAGE**

Fuel filters are an important part of fuel systems because they remove normal fuel contaminants before they get to the engine. Fuel filters have a limited life which depends on how much contaminant they must remove, normally they are changed at specified service intervals. **If fuel filters block before the regular changeover then it indicates that there may be more than normal contamination in the fuel.** A visual inspection of the fuel will confirm if that is the case.

Common types and sources of contamination are described below.

### **DIRT**

Dirt, dust, sand and similar contaminants commonly enter through fill pipes, access hatches and breather pipes. The amount of contamination will be noticeably worse in dusty areas. **Normally they settle on the bottom of the storage tank and do not cause a problem unless they are stirred up or held in suspension** by some other contamination. **After filling a storage tank it should be left for a period of time to allow dust and dirt to settle.**

### **RUST**

Metallic contaminants, notably rust, occur mostly as **corrosion debris from storage tanks and distribution system** parts. These contaminants can plug filters, and can also support fungal growth and encourage fuel degradation. Fungal contamination if left untreated will increase corrosion producing more rust.

### **WATER**

Water can enter the fuel system as part of the refining process, as **rain, or as condensation**. Water dissolved in the fuel will not change its appearance, whereas **undissolved water will form droplets which make the fuel appear hazy or milky**. Water can enter fuel tanks in air, and will condense when the ambient temperature drops low enough. **Water in the fuel system will cause corrosion, and promote fungal growth.**

**All storage tanks should have a drain valve at the lowest point through which water can be drained off at regular intervals.**

### **BUGS**

Various species of fungus, bacteria, and yeasts are able to **grow in fuel, provided water is present**. Most of these organisms produce acids, which can corrode engine parts. Microbiological contamination is prevalent in parts of the fuel system where fuel is allowed to remain still, where water (eg. spots of condensation) may be present. Colonies of organisms can plug filters and screens in the fuel system.

Normally bugs appear as slimes and scums.

## **WAX & GUMS**

**Wax:** This is a normal component of fuel but in unusually low temperatures it can separate from the fuel and plug filters. Cloud point is the specification test used to measure this property of the fuel, and is adjusted on a monthly basis. It should be remembered that a fuel purchased in summer will form excessive wax if used in winter. Wax appears as a light yellow suspension in the fuel. To avoid winter waxing problems plan to change over all fuel before May at the latest. There is a two month lead time in the distribution of the fuel to ensure that all diesel sold in May is winter grade.

**Gums:** These can be formed from chemical changes to the fuel, notably by exposure to oxygen, high temperature, acids, and metals during storage. Gums drop out of the fuel in the form of sediment which can block injectors and fuel filters. **It normally takes more than 6 months for refined fuel to produce significant amounts of gum.**

## **MONITORING AND CLEANING**

A program of regular fuel inspection and system cleaning will alert fuel users to excessive contaminant levels. Important points to consider are:

1. Fuel used for filling or refilling the supply tank should comply with appropriate standards. The cloud point should be less than the minimum temperature at which fuel will be stored.
2. There should be a regular inspection of fuel from the bowser after running off the first 20 litres. Fuel should be clear and bright with no trace of haze.
3. Accumulated water should be removed from the lowest point of the tanks and fuel lines on a monthly basis, even weekly if possible. Where appropriate, check that vents and fill points are not letting rain water and dust in.
4. At ten year intervals, the fuel in the supply tanks should be removed, sediment and water removed, and the tanks cleaned. This cleaning should be accomplished using sodium hypochlorite solutions (or equivalent), in preference to soap or detergents.
5. Whilst fuel is being added to the supply tank, equipment should not be drawing off fuel out of the tank, in case residual sediment at the bottom has been stirred up.

## **SENDING SAMPLES TO THE LABORATORY**

When samples are taken to resolve a filter blocking problem at a customer's site then a sample of a blocked filter should be sent along with a sample of the fuel from the storage tank. Always check that regular water draining is carried out by the customer.

When sampling from the storage tank always run off sufficient fuel to clear the lines before taking the sample. Sample into a clean glass container and do a visual inspection first, this will save a lot of time because a visual inspection may reveal the cause of the filter blockage straight away.

The fuel should always be clear and bright with no suspended free water or matter. It should not be unusually dark, hazy or milky and water and dirt should drop to the bottom straight away.

**For further information, please call the BP Lubricants and Fuels  
Technical Helpline  
1800 033 558  
freecall**

or visit [www.bp.com.au/fuelnews](http://www.bp.com.au/fuelnews)