

Measuring diesel engine consumption

The concept of using an oil meter on the fuel feed line to the engine and a second meter on the return, then taking the difference as the net engine consumption, normally doesn't work.

If your engine is a Cummins, the return line has a substantial percent of combustion head gases, causing the meter to read high. In some cases, it will look as if the engine is producing fuel.

If your engine is a GMC®, the returning combustion gas content is so high that you will cause severe meter wear. We have seen oil meters totally destroyed in 2-3 weeks service on GMC fuel return lines.

If your engine is a Caterpillar, after a period of time, when the seals on the inlet side are showing some wear, the increased load imposed by the inlet fuel meter will cause some suction of air past the seal. This shows up in the returning fuel line. The result is that as the engine ages it seems to get remarkably better fuel economy.

The solution to the problem is to provide a recirculation tank. The tank has a fuel return line from the engine. This line is fed into the tank through a wire mesh pad located just inside the tank wall. This mesh helps separate out the foam from the solid liquid. The fuel supply line comes from the main tank, through this recirculation tank and into the fuel feed line to the engine. Where this line passes through the recirculation tank it is fitted with a float valve. When the tank is low or empty and the float is down, the float valve is closed. This keeps the engine fuel pump suction from pulling recirculated fuel from the tank. As the return fuel fills the tank, the float will lift, opening the valve and allowing the returned recirculating fuel to be blended into the fresh fuel being pulled from the main supply tank.

A fourth line is required to vent the recirculation tank back to the main supply tank. If the foam in the tank is excessive, this will also be pushed back to the main supply tank. If the float valve fails to open, the returning fuel will be returned to the main fuel tank.

The flow meter is installed in the makeup line to this recirculation tank.

Some cautionary notes...

The float must be heavy enough to not be affected by the foam riding on top of the fuel. It must ride on the liquid fuel in order to ensure that foam is not sucked into the engine. The float is subjected to side forces as the fuel sloshes around in the tank. The float pivot arms must be strong enough to take this abuse. Hot diesel fuel causes a decrease in engine horsepower. Accordingly, the tank should be big enough to allow the fuel some cooling time. If this is not possible, radiation fin cooling needs to be applied to the return fuel line.

This recirculation tank is a fuel containment vessel and must meet DOT standards.