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cen·pe·co® LUBRICANTS

CENTRAL PETROLEUM COMPANY
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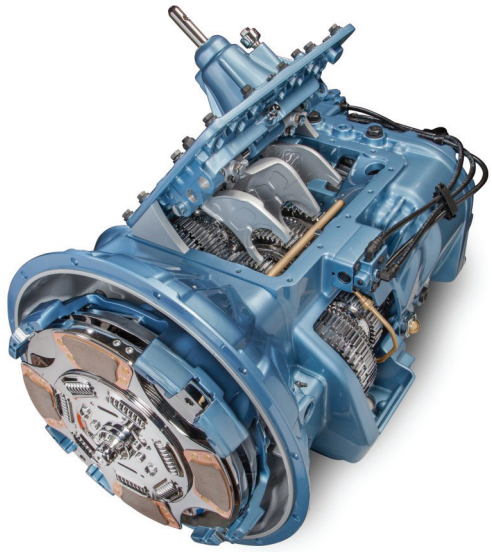
New CenPeCo Synthetic MTF

By: Blaine Ballentine



CenPeCo Synthetic MTF now meets Eaton PS-386 specifications. Beginning January 2017, Eaton replaced their PS-164rev7 specification with PS-386. PS-386 is required for extended warranties in practically all Eaton transmissions, with the exception of the dual clutch Procision series.

There is a trend toward automated transmissions because it is easier for fleets to attract young drivers, many of whom have not really learned to drive a manual transmission. Eaton's longest recommended drain interval, 750,000 miles, is in their automated transmissions, where the gears never grind.

Even though the "MTF" in CenPeCo Synthetic MTF Oil stands for **M**anual **T**ransmission **F**luid, it is also recommended in heavy duty automated and hybrid transmissions.

Eaton still recommends petroleum oils in their heavy duty manual transmissions below 1.850 lb-ft of torque and medium duty manual transmissions, however not to support extended warranties. In those transmissions, SAE 50 heavy duty engine oil, such as CenPeCo S-3 SAE 50 and SAE 40, or oils meeting Cat TO-4 SAE 50 specifications are recommended with 60,000 mile drain intervals. For heavy duty manual transmissions above 1.850 lb-ft of torque and for extended warranties in nearly all of their transmissions (except the dual-clutch Procision series) PS-386 fluids are recommended.

One of the advantages of PS-386 oils, compared to the previous PS-164rev7 specification oils, is improved fuel economy. You may have noticed on our price list that the "50" was omitted from the name of our MTF. The reason is the new fluid is a little thinner, and now falls within the limits of the SAE 40 motor oil grade, but remains within the limits of the SAE 90 gear lube grade. PS-386 is backward compatible, and Eaton recommends it in all previous PS-164rev7 applications.

Eaton is by far and away the market leader in heavy truck transmissions, and CenPeCo Synthetic MTF meets their most recent specification.

Reference:

Eaton® Lubrication TCMT0021 EN-US Product Specification Manual, October 2017.
http://www.eaton.com/ecm/groups/public/@pub/@eaton/@roadranger/documents/content/tcmt0021en-us.pdf

More than you ever wanted to know about

How CenPeCo Diesel Fuel Additive Lowers DEF Consumption

By: Blaine Ballentine

We received a couple reports from customers that their DEF consumption went down dramatically after they started using CenPeCo DieselMax. So, we decided to investigate.

Chemistry

During combustion, energy from heat and compression cause nitrogen and oxygen to combine, forming nitrogen monoxide (NO) and nitrogen dioxide (NO_2). When released from tailpipes, they can react with atmospheric gases to cause acid rain and smog, so NOx emissions from engine exhaust are being regulated.

NOx are not much of a factor in gasoline engines because combustion temperatures are lower and combustion tends to consume all of the available oxygen (the O in NOx). Diesel engines, on the other hand, are oxygen rich and combustion temperatures are higher, so they produce significate amounts of nitrogen oxides.

The oxygen rich environment of diesel combustion is the reason for EGR (Exhaust Gas Recirculation). Exhaust gases displace some of the excess oxygen, so less oxygen is available to combine with nitrogen to form NOx.

DEF (Diesel Exhaust Fluid) has been used to control nitrogen oxide emissions from diesel vehicles since 2010. It is a mixture of 32 ½ % urea and 67 ½ % water.

When DEF is injected into the hot exhaust stream, the water and urea react to form ammonia (NH_3). Then the ammonia reacts with the nitrogen oxides (NOx) to yield nitrogen gas (N) and water (H_2O).

$CH_4N_2O + H_2O \rightarrow NH_3 + CO_2$
urea + water yields ammonia + carbon dioxide

$NH_3 + NO_2 \rightarrow N + H_2O$
ammonia + nitrogen dioxide yields nitrogen + hydrogen

$NH_3 + NO + O_2 \rightarrow N \& H_2O$
ammonia + nitrogen monoxide + oxygen yields nitrogen and water

Emissions Systems

The chemistry explains why the emissions systems work, but we still need to know how, the mechanics of it. So, we asked Lee Roe of Roe's Diesel Repair near Rudd Iowa and Tracy Nicholson at Billion Ford in Clear Lake, Iowa how systems actually work.

A diagram of a basic exhaust emissions system is shown in Figure 1, although there are variations. The DPF (Diesel Particulate Filter) is the first major component. As the name implies, it is used to remove particulate matter, which is the fancy way to say "smoke." The particles are soot, incompletely burned fuel particles comprised primarily of carbon.

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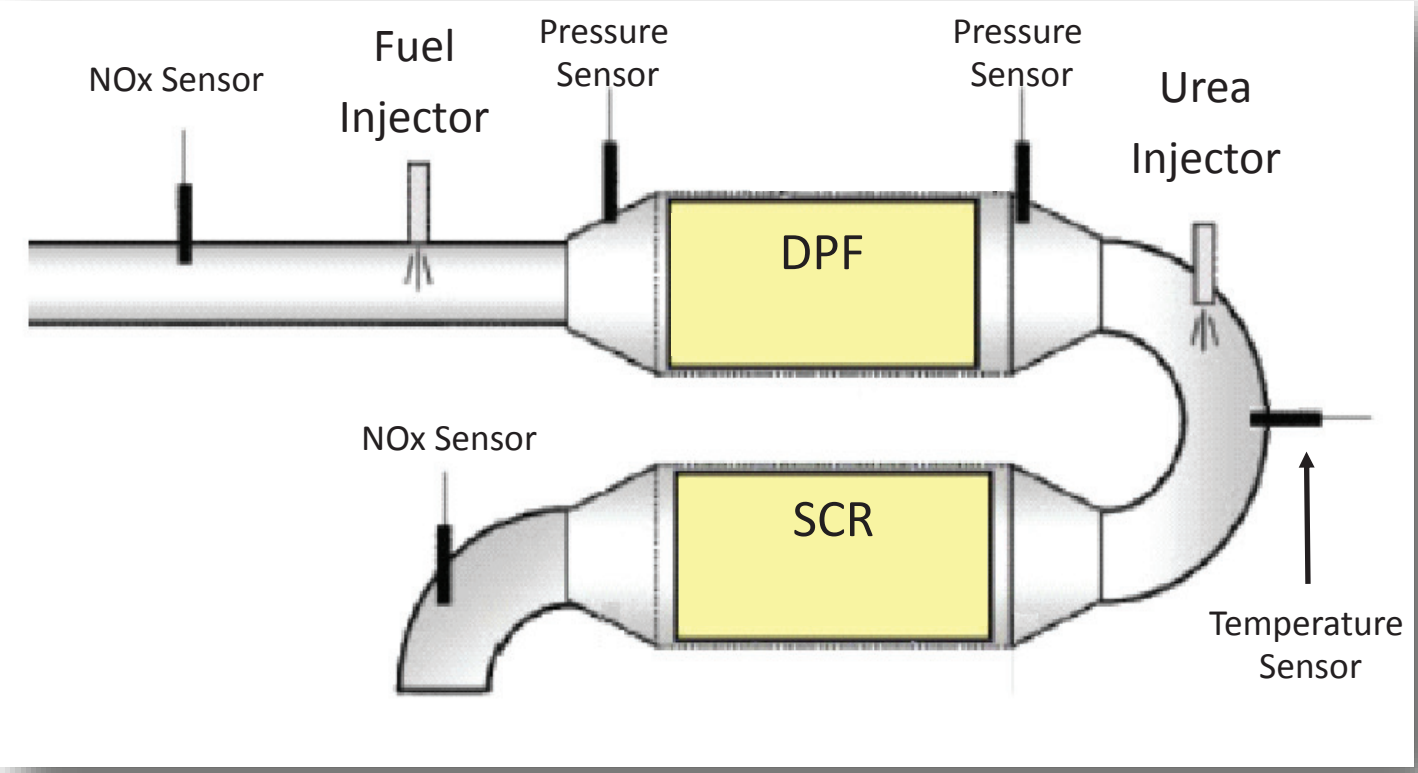
There is a pressure sensor in front of the DPF and one behind it. Pressure differential indicates the DPF is plugging and triggers a regeneration cycle. An injector in front of the DPF sprays diesel fuel into the hot exhaust stream to get the DPF really hot. The heat converts the carbon to carbon dioxide to clear out the filter. You can think of it as burning the carbon out of the filter.

Temperature sensors, NOx sensors and/or oxygen sensors are located after the DPF. Signals from these sensors are sent to the computer, which in turn controls the DEF injector, which is located between the DPF and catalyst. The catalyst is often referred to as the SCR for Selective Catalyst Reduction, but it is where the reactions to convert NOx to nitrogen and water take place.

Combustion at high temperatures produces NOx, including the combustion of the diesel fuel sprayed into the exhaust stream during regeneration. So during regeneration, the DEF injection system is working overtime to deal with the additional NOx. Putting our puzzle together, DieselMax promotes more complete combustion, and less soot is produced. Less soot means fewer regens. Fewer regens means less DEF is injected. So yes, DieselMax reduces DEF consumption.

Even when the DPF is not regenerating, there is less need for DEF injection when using DieselMax. If the fuel is burned faster and more completely in the cylinder due to higher cetane, more heat is generated in the cylinder, but then the exhaust gas is cooler. The temperature sensor in the exhaust system signals less heat to the computer, which then tells the DEF injector to slow down. So even when the emissions system is not regenerating, DieselMax reduces DEF consumption.



New Claim

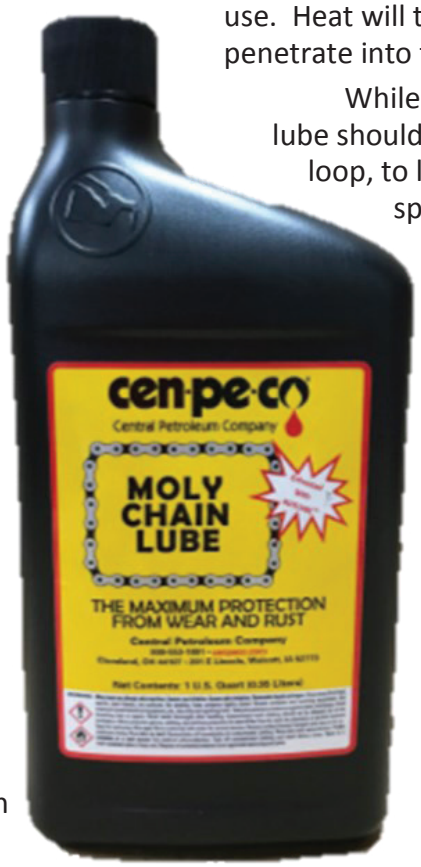
Our customers told us they used less DEF when using DieselMax. We knew DieselMax promoted more complete combustion, which produces less soot to get caught in the DPF, and therefore, fewer regens. What we learned was additional DEF use is tied to regens. Also, more efficient combustion lowers exhaust temperature which also means less DEF is used.

We can legitimately claim lower DEF use with CenPeCo cetane improving additives.

Chain Reaction to lubricants

By: Blaine Ballentine

Lubricating roller chains can be challenging. There are both sliding and rolling friction, extreme pressure loads, shock loads when the sprocket teeth engage the chain, and often in a dirty or wet environment.



Most chains fail as a result of ineffective lubrication, and perhaps the highest failure rate is from running dry. Wear causes the chain to stretch, which changes distance between pins. At this point the chain should be replaced, because an elongated chain does not engage the sprockets smoothly. This causes accelerated sprocket wear or damage, and sprockets are often more expensive to replace than the chain. If the stretched chain is not replaced, it will occasionally skip a tooth and finally the chain breaks or jumps the sprocket, possibly damaging anything nearby. Then it is not just the replacement cost, but also the lost production from downtime.

A good chain lubricant has sufficient viscosity to lubricate between the pins and bushings, bushings and rollers, rollers and sprockets, and between link plates. It needs to have corrosion inhibitors to provide protection from rust. It should have an EP (Extreme Pressure) additive to deal with the shock loads generated by the chain intermeshing with the sprocket teeth. Finally, it needs to wet out the surface and cling.

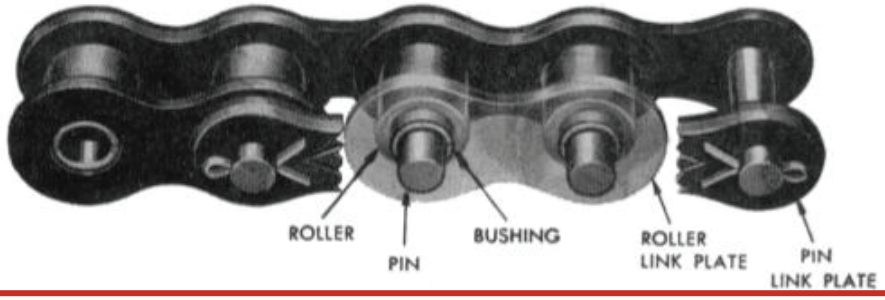
Oil on the outside of the chain does not prevent chain stretch. The oil has to get down between the pins and bushings to be effective. Part of penetrating the pins is viscosity. That is why the best time to oil the chain after it has warmed up with use. Heat will thin the oil, allowing it to better penetrate into the pins and bushings.

While we are discussing application, chain lube should be applied to the inside of the chain loop, to lubricates between the roller and sprocket.

CenPeCo Moly Chain Lube is not made from flush oil, but is purpose built product for roller chains. It is made with paraffin base bright stock, which is SAE 140 in viscosity. We need to get that thick oil down into the pins, so we add a solvent. No, the solvent is not to water it down and make it cheaper. It is a special solvent that evaporates nearly twice as fast as mineral spirits and actually costs more than bright stock. The solvent helps the chain lube to creep and penetrate into the pins and bushings, the solvents vapors off, and the SAE 140 oil is left down in the chain where it is needed most.

CenPeCo Moly Chain Lube also contains molybdenum disulfide to fight sliding wear. Its EP additives deal effectively with the shock loads generated by the chain engaging with sprockets. A tacifier additive causes it to cling to the chain. And corrosion inhibitors stop rust from rain or dew.

Frequently applying CenPeCo Moly Chain Lube to the inside of a hot chain loop will greatly extend the life of the chain and sprockets.



Reference:

"Lubed Chains Live Long Lives," *Efficient Plant Magazine,* 7/18 p27.