FILTER MANUFACTURERS fmc COMMUNITY

TECHNICAL SERVICE BULLETIN 84-3

Light Duty Diesel Engine Service

A diesel engine operates differently than a gasoline engine and therefore, different service and maintenance practices must be followed.

In a gasoline engine the combustion process occurs at constant *volume*. This process is characteristic of the spark ignition, or Otto cycle. The combustion process of the diesel engine occurs at constant *pressure*. This process is characteristic of the compression ignition or diesel cycle. A gasoline engine requires spark plugs to ignite the air/fuel mixture, whereas the diesel engine's air/fuel mixture is burned by the heat caused by compression.

The diesel engine operates at higher compression ratios than does the gasoline engine and burns low volatile fuels. Fuel injection is a requirement of the diesel engine since the fuel enters the combustion chamber near the end of the compression stroke. A gasoline engine can run with a carburetor system or injection system. Careful maintenance of the lube, air induction and fuel systems is a must for diesel engines.

There are several factors unique to diesel engines that affect service considerations. The combustion process allows the use of a variety of fuels. These fuels are "less refined" than gasoline and therefore, are more unstable. Cold temperatures can produce wax precipitates that will plug fuel filters (TSB 91-1). Water is more prone to be present in diesel fuels and if not removed, can easily damage injection systems. Micro-organisms and water can cause filter plugging and corrosion problems (TSB 95-1).

Fuel filtration is of prime importance for diesel engines. The filters must be high efficiency units specifically designed for diesel service. Maintenance must be followed regularly to maintain a smooth and reliable running system. Fuel filters for diesel service cannot be treated with the complacency given filters in gasoline service.

Water should be removed at a point before the injection pump. Some fuel filters combine water removal features and filtration features in the same package. Diesel fuel handling from process to storage tanks, to engines, traditionally contains more water than gasoline systems. Water is a definite problem in diesel fuels and it must be dealt with accordingly.

Low temperatures tend to precipitate wax in diesel fuels. In order to get the fuel to flow through filters correctly, it is generally heated in the fuel system of the engine.

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Certain lube oils are specifically designed for diesel service. The combustion process, blow-by products and engine loads are different in a diesel engine, as compared to a gasoline engine. The lube oil, therefore, must do a specific and different job, depending on whether it is used in diesel or gasoline service.

The American Petroleum Institute (API) has developed a classification system for engine lube oils. The classification system covers various categories based on engine age, type and service. Any oil carrying an API designation guarantees the fact that oil has met the specification requirements for its intended service. When servicing a diesel engine, the proper API designated oil must be used.

During the combustion of diesel fuel a great amount of soot is generated. Some of the soot gets into the lubricating oil with the blow-by gases. This is the type of material that tends to plug oil filters.

Acids tend to form in diesel lube systems, caused by the combustion process and type of fuel burned. These too, can shorten the life of oil filters as well as cause corrosive wear.

Raw fuel is more apt to get into the lube oil in diesel systems as compared to gasoline systems. The fuel dilutes the oil and affects its lubricity properties.

The importance of lube system service is apparent. Specified service intervals, in fact, are usually shorter than those for gasoline engines. Considering severe driving conditions such as short trips, long idle times and extreme engine loads, one can readily see the need for regular lube system service.

The air filter requirements for diesel engines are similar to those for gasoline engines. The dirt, dust and grit must be removed from the air stream before it gets into the combustion chamber. If the diesel system is turbocharged, then more frequent air filter service intervals should be considered.

Light duty diesel engine service requirements are different than those for gasoline engines. Owner's manual recommended services should be followed very closely. If severe driving conditions exist, service intervals should be shortened. As with the gasoline engine, proper service and maintenance practices should be followed.

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