

specifications will result in optimum engine performance and durability. Depending on fuel costs and availability, the proper use of alternative fuels such as crude oil, blended oil or residual oil can also provide cost competitive engine operation.

Diesel Fuel Types

Crude Oil

The term crude oil is used to describe petroleum-based oils/fuels that are not yet refined. They are essentially in the same state as when they were pumped from the earth.

Certain types of crude oils can be burned in Cat engines. In some cases, crude oil is a practical and economical fuel for diesel engines. Crude oils are evaluated individually and special equipment may be needed to condition the fuel. Minimum guidelines have been established to determine the suitability of crude oils as shown in **Appendix 2**.

Residual Oil or Blended Heavy Fuel Oil (HFO)

Residual fuel (which resembles tar and contains abrasive and corrosive substances) is composed of the remaining elements from crude oil after the crude has been refined into diesel fuel, gasoline, or lubricating oil.

After the more desirable products have been refined, residual fuel can be combined or diluted with a lighter fuel to produce a mixture that can flow. This mixture is called blended or heavy fuel. Heavy fuels tend to create more combustion chamber

deposit formations which can cause increased cylinder and ring wear.

Blending may improve fuel density; however, adding alcohol (ethanol, methanol) or gasoline causes an explosive atmosphere in the tank and is not recommended.

Cat 3600/C280 diesel engines, in general EPG applications only, can be modified to run on blended fuels, but extreme PREVENTIVE MEASURES MUST BE TAKEN, including following a thorough maintenance program and use of high quality fuel treatment equipment. For any other applications including marine, petroleum, industrial, etc. that require the burning of blended fuels, MAK Engines should be considered.

Blended fuel can lower fuel cost, but there are often significant trade-offs. Fuel price must be weighed against the following.

- Fuel containment effects
- Reduced engine component life
- Higher maintenance and personnel costs
- Reduced warranty

Distillate Fuel

Distillate fuels are refined from crude oil and are commonly referred to as diesel fuel, furnace oil, gas oil, or kerosene.

Marine Diesel Oil

Many different names are used for marine diesel fuels, which can often cause a misunderstanding. Four types of marine diesel fuel are generally recognized and available at bunkering ports around the world. However, not all of the types are available at every station.