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Materials Unit project

Most people only know about 1 or maybe even 2 diesel types of fuel but really there are 4. They are put into categories/grades from highest to lowest viscosity – The state of being thick, stick, and semifluid in consistency, due to internal friction -- starting with Number 1 Diesel Fuel (1-D), Number 2 Diesel Fuel (2-D), Number 3 Diesel Fuel (3-D), and Number 4 Diesel Fuel (4-D). 3-D Fuel is no longer refined and 4-D fuel is used on large machinery that isn’t necessarily mobile. But on the other hand 1-D and 2-D fuels are used every day on the roads. We use this type of fuel in our larger automobiles and although it runs off fuel we cannot just put gasoline in these types of engines. The difference between these relate to the cetane number as well as when we use them according to the weather. It is very important to pay attention to what you are putting into your engine as well as what to change as the seasons change.

Cetane is a colorless liquid hydrocarbon of the alkane series, C16H34, used as a solvent. However the Cetane number is a measurement of the combustion quality of diesel fuel during compression ignition. It is a significant expression of the quality of a diesel fuel. Diesel Fuel 1 has a Cetane number of 44 or 45, while No. 2 has a cetane number usually at 40. The higher the number the shorter the ignition delays, which gives more time for the combustion process to be completed. Cetane is not the only thing in diesel fuel. Diesel fuel can also be known as Patroleum diesel, which is made from fractional distillation – similar to the process of separating chemical compounds by boiling point – of crude oil. This results in many carbon chains. More measures of quality are: Density, lubricity, cold-flow properties, and sulfur content.

We use No. 1 diesel fuel during the cold weather months because it isn’t as thick as No. 2. Some people even mix No. 1 diesel with No. 2 diesel fuel. This is done to reduce cloud point – the temperature at which dissolved solids are no longer completely soluble – in colder climates. No. 2 diesel fuel is more widely used. This diesel fuel has more lubricating abilities than No. 1 does. The length of an alkane chain changes its boiling and melting points. Diesel is a long alkane chain making it a liquid at room temperature. This changes the differences in cloud point/ changing the “freezing” point of the liquid.

Starting with No. 1 diesel fuel, which is very helpful during winter months because of its low viscosity. This allows the fuel not to “freeze” as easily as it would with No. 2 diesel. By freezing we mean “cloud point” or small wax crystals being formed. When this happens it can clog fuel filters and fuel injectors causing it to stop running altogether. No. 1 fuel has less lubricity than No. 2 which can cause problems with the fuel injection pumps. No. 2 diesel provides the most energy per gallon and more mileage.

We need to pay attention to what we are putting into our engines and what will help keep our trucks out of the repair shop. When you are getting into the winter months make sure to pay attention to how your engine is starting and whether or not you need to start changing your fuel. If you do not you could be taking a lot of trips to the auto shop to replace your fuel injector pump as well as your fuel filters.