10. Are there special considerations for storing and handling biofuels?

Ethanol and biodiesel are the two main types of biofuels. Ethanol is produced from carbohydrates using a fermentation – distillation process. Biodiesel is a renewable fuel manufactured from vegetable oils, animal fats and recycled cooking oils. The most common use for these biofuels is as additives: ethanol is blended with gasoline and biodiesel with petroleum diesel. For ethanol, blends up to E10 (10% ethanol) are quite common since it requires no engine modifications. For biodiesel, blends of B2 – B20 (2 - 20% biodiesel) are commonly used in Alberta. Blends higher than B20, up to B100 (100% biodiesel) are not as common, mostly due to cold weather issues.

Ethanol-blended gasoline

For the most part, ethanol blended gasoline can be handled and stored in the same way that gasoline is. Steel tanks are compatible with ethanol blended fuel storage; however, ethanol has a few characteristics that are quite different than gasoline. These features affect the storage of these blended fuels. The first is ethanol's tendency to be a solvent and second is its high affinity for water. Because of this, there are a few simple steps to follow ensure fuel quality and safety.

First, ensure storage tanks are clean before using for ethanol blends. A tar like substance tends to accumulate over time in gasoline storage tanks and this can be loosened in ethanol-blended gasoline. These deposits can then accumulate in fuel filters and could lead to engine performance problems. To ensure fuel quality, existing gasoline storage tanks should be thoroughly cleaned prior to first fill of ethanol blended fuel.

Second, ensure that there is no water in the tank. Water contamination of ethanol-blended fuel can lead to phase separation, where the ethanol separates from the gasoline and mixes with the water. This will lead to a poor quality gasoline. Prevention of water contamination in ethanol-blended gasoline is extremely important.

Lastly, install filters on fuel dispensers. Using a 10 micron filter on the dispenser will reduce filter clogging on equipment, catching any deposits that may have accumulated since the initial cleaning.

Biodiesel (B20 blends)

Considerations for the storage of biodiesel are very similar to that of petroleum diesel as most tanks designed to store diesel fuel are adequate for biodiesel. Acceptable storage tank materials include aluminum, steel, fluorinated polyethylene, fluorinated polypropylene, teflon, and most fibreglass materials.

The effects on hoses, gaskets, seals, glues and plastics using biodiesel blends of B20 or less have shown to be very small. For low-level blends such as B2, the effects are virtually non-existent. It is recommended that when handling blends of B20 or less, regular monitoring of hoses and gaskets for leaks would be sufficient.

B20 blended biodiesel can typically be used as a direct replacement for No.2 petroleum diesel in diesel engines. Over time, rubber components may degrade and need to be replaced. Storage in hot humid conditions may lead to increased fuel degradation, but this can be addressed by using double walled tanks, shade, or biocide additives.

Cleaning Effect:

Biodiesel is a solvent. Any sediments or deposits left in existing storage tanks used for petroleum diesel may become dissolved in the biodiesel. The level of "cleaning" depends on the amount of sediment in the system, as well as the blend of biodiesel. The cleaning effect will be much greater for B100, and minimal for B20 blends. Sediments may plug fuel filters for the first few weeks of using B20 biodiesel. Keep some extra filters on hand and monitor potential filter clogging a little closer than normal when first starting up with B20 blends. For B100, it is recommended that exiting tanks and fuel systems be cleaned before handling or using B100.

Biodiesel (B100)

The major issue with storing and handling B100 biodiesel, especially in Canada, is the temperature factor. The cloud point of B100 ranges from 3 – 15 degrees Celsius. The clouding can lead to plugged lines and filters. As the biodiesel starts to gel, pumping equipment becomes stressed due to the increased viscosity of the biodiesel. Because of this, heated and insulated tanks, lines and pumps are needed for handling B100 biodiesel.

There are also some metal compatibility issues when storing B100 biodiesel. Brass, bronze, copper, lead, tin and zinc may cause the oxidation of biodiesel, creating fuel sediments or gels and salts. For this reason, lead solders, zinc linings, copper pipes and fittings, and brass regulators should be avoided. Affected equipment should be replaced with stainless steel, carbon steel, or aluminum. Using blends of B20 and lower will greatly reduce the impact of these issues.

With blends greater than B20, biodiesel compatible gaskets and elastomeric materials are highly recommended. B100 may degrade some hoses, gaskets, seals, glues and plastics with prolonged exposure. Natural or nitrile rubber compounds, polypropylene, and polyvinyl materials are particularly susceptible. Teflon, viton and hylon are among the materials that can be used to update incompatible equipment. Before handling or using B100 biodiesel it is highly recommended that you contact the equipment manufacturer to determine its compatibility.