

## **May 12, 2006: ASTM D6751 Update**

The latest version of D6751-06-e1 has been published and is available on the ASTM web site as of May 12, 2006. This updated version includes two changes, including a lower acid number limit of 0.5 mg/KOH, and the inclusion of a combined Na + K limit of 5 ppm. This revised specification represents the new legal requirement for biodiesel as of the release date. These changes are good for the biodiesel industry, in that they will help ensure fuel quality, seen as a significant hurdle toward more widespread use of biodiesel fuel. However, these more stringent specifications may prove difficult for some current fuel producers to meet.

### Acid Number

Acid number is a measure of free fatty acids (FFA), which are natural degradation products of fats and oils. Acid number is an indicator of initial quality of biodiesel fuel, as well as a level of fuel oxidation. Acid number measurements greater than 0.8 mg/KOH have been associated with biodiesel that has caused fuel system deposits and reduced the operating life of fuel pumps and filters, and has a propensity to corrode metal parts in a vehicle fuel system.

The new acid number limit of 0.5 mg/KOH is more stringent than the previous limit of 0.8 mg/KOH. This substantial reduction may well present a problem for many biodiesel fuel producers. Of the 27 samples analyzed in NREL's *Survey of the Quality and Stability of Biodiesel and Biodiesel Blends in the United States in 2004*, nine samples (33%) would have failed this new more rigorous acid number limit of 0.5 mg/KOH.

### Na + K

The presence of sodium and potassium (Na + K) in high concentrations is indicative of residual catalyst (NaOH or KOH) in the fuel. High levels of these alkaline materials contribute to soap formation, which can plug fuel filters. Additionally, high concentrations of Na + K can result in fine particulates that may impact fuel injectors, and may increase ash content in lube oil.

This new Na + K limit of 5 ppm is an addition to D6751. This new limit will add another necessary element to the ASTM spec to be met by producers, but based upon results in NREL's aforementioned study, meeting this new Na + K limit will not be as difficult as the new acid number limit. Of the 27 samples analyzed, only one (4%) would have failed the Na + K limit of 5 ppm.

### Other Potential Downstream Changes to D6751

Don't think we're through seeing changes to the ASTM spec for biodiesel. In an effort to tighten fuel quality, serve a larger market, and set OEMs at ease, the ASTM spec will continue to morph. It is likely that before the end of the year, several more additions and changes will occur. Elements of D6751 with strong potential to see an update are flash point, water and sediment, kinematic viscosity, and glycerin. Stay tuned.

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