

Comment on the proposed Standard for Fuel Parameters (Ethanol)  
Commonwealth Position - April 2005

**Renewable Fuels Australia**

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The Report prepared by the Hart Downstream Energy Services provides a general survey of the fuel quality standards ethanol is produced to meet around the world. It does not, however, provide a comprehensive survey of the use of ethanol either in dedicated or flexible vehicles, or in the form of E10. Nor does it effectively address the rapid developments in flexible fuels vehicle technologies.

The ethanol standard observed by current ethanol producers (mainly CSR and Manildra) is the U.S. ASTM D4806. In the case of Manildra a corrosion inhibitor (DCI 11, produced by Octel) is also added. This is also the practice followed by the U.S. industry. It is anticipated that new industry entrants will also follow the ASTM D4806 standard with a corrosion inhibitor, although this may not be required should fuel ethanol be sold directly to the major oil companies and added with petrol as part of the refinery process.

Currently CSR Sugars produce and sell fuel ethanol that meets the higher British Pharmacopoeia (pharmaceutical) Standard (BPS. This is because the dehydration and purification of the hydrous ethanol they produce at Sarina (near Mackay) in Queensland is currently undertaken at Yarraville in Victoria using an older technology cyclohexane process focussed on the demands of the pharmaceutical market - not transport fuel. When CSR installs a modern molecular sieve dedicated to producing fuel grade anhydrous ethanol at its Sarina distillery, it is assumed that CSR will produce fuel ethanol to the ASTM D4806 standard, as producing to the higher grade pharmaceutical standard could add up to 3 cents per litre to the cost of production.

(Storage and Handling)

As with petrol, with well tested and developed housekeeping practices, fuel grade ethanol will not draw water in and go off-spec sitting in a storage tank. After some 30 years of use in the United States and Brazil the characteristics of ethanol use and handling requirements are well known by both the ethanol and petroleum fuel industry.

(Vapour Pressure and Evaporative Emissions)

The report's coverage of these issues is cursory only, and in some places incorrect. Its coverage of evaporative emissions also reflect this.

(Corrosion)

The report at times provides a misleading image of ethanol as a highly corrosive substance, whereas in reality it is not a very reactive substance, as storage specifications demonstrate. This is particularly overstated with respect to E10, where standard practice in the U.S. and predominantly in Australia a corrosion inhibitor is added to remove any doubts about the majority petrol component of E10. Extensive trials conducted both in the U.S. and Australia on E10 have clearly demonstrated that E10 is compatible. General Motors in the U.S. have been warranting the use of E10 in their vehicles for 20 years.

(Flexible Fuel Vehicle)

Again the initial image presented by the report on Flexible Fuels Vehicles was one of potential risk to vehicles. This ignores that the major automobile manufacturers producing dedicated and flexible fuel vehicles from the very beginning did everything in their power to produce vehicles fully capable of dealing with the fuels that they warrant the use of in their vehicles. And, they were successful in addressing these potential issues.

Over the past couple of years there has been a surge in sales of flexible fuel vehicles both in the U.S. and especially in Brazil where Flex Vehicles are being produced by the major automobile manufacturers that can operate on hydrous and anhydrous and LPG. Sales of Flex Vehicles in Brazil have been as high as 50,000 per month.

Given the rapid advances in flexible fuel technologies consideration might be given to setting an E85 fuel standard in advance of their introduction in Australia.

(Involatile Matter & Solvent Washed Gum)

Both Manildra and CSR test for non-volatile matter. This is consistent with general worldwide practice, and is considered more accurate than solvent washed gums. Neither CSR or Manildra test for solvent washed gum. A well recognised advantage of E10 is its record of keeping fuel and engine systems clean in vehicles. Both CSR and Manildra state that the results are well within recommended limits.

(Water Specification)

ASTM D4806 sets a standard designed to address the extremes of climate

experienced in America. Extreme conditions that are not experienced in Australia. This was clearly demonstrated in the 1997/98 ERDC Trials of E10 (Project No2511) which demonstrated that neither hot or cold start was an issue in Australia.

(Appearance)

Both CSR and Manildra produce a clear, colourless liquid free of any foreign matter.

(Fusel Oil or Fusel Alcohol)

Typically grain based ethanol does not contain a lot of fusel oils, any fusel oils contained in sugar based ethanol would be expected to be offset by their involatile matter specification of 2.5 mg/100 ml maximum. Further the minimum ethanol content of denatured ethanol plus the denaturant limit the presence of other components, including fusel oil. Industry does not consider that a limit is warranted. ASTM D4806 does not include a limit. Fusel oils in the U.S. are left behind in the ethanol for the benefit of the fuel, and practice is for co-produced products to be counted along with ethanol as fuel grade ethanol. Fusels are mostly higher alcohols and they burn well in vehicles. In addition they increase the energy density, burn cleanly, and provide co-solvent protection against phase separation.

(Aldehydes)

Aldehydes come from the combustion of fuel, and in a E10 blend the major source of aldehydes is the petrol component. There would never be formaldehyde in unburned fuel ethanol. Failure of the catalytic converter to complete the combustion process, and the partial oxidation of ethanol may result in a rise in exhaust aldehyde, but on a mass basis this has not been found to be considered significant.

(Summary)

ASTM D4806 has been demonstrated to be a robust standard which has successfully served a huge and growing fuel ethanol market in the United States, and have proven a stable base for an Australian Standard which could service both a local market and possible future export markets.

It is proposed that any Australian standard be based on undenatured ethanol, with the denaturant amount and type referenced to the same specification. This is supported in the report.

The on-road record of E10 use in Australia since its re-introduction in 1992 could only be described as excellent, with no substantiated cases of ethanol-related engine damage being reported. Clearly existing industry standards and practices have served the industry and the consumer well.