



Australian Renewable Fuels Limited

Response to the
Department of Environment and Heritage
Discussion Paper on:

Standardising Diesel/Biodiesel Blends

January 2007

Standardising B5, B20 Diesel/Biodiesel Blends

ARFuels would like to begin its response by stating that we strongly discourage the introduction of B5 and B20 biodiesel/diesel standards that would require additional testing requirements. These measures are supposedly being introduced to help address market barriers and restore consumer confidence in the Biofuels industry. The introduction of these standards will impose further hardship on an emerging industry that was substantially crippled by the fuel tax changes in July 06 and will further harm the industry.

The proposal is also in conflict with the DEHs policy position in that the “Fuel standard must not impede competition, either between Australian refiners, or imported refined product.” There are already inequities in the market caused by government policy. We believe that competition will be inhibited further if blend standards are introduced that puts the onus on the biodiesel producer to conduct further testing and ensure that biodiesel/mineral diesel blends meet blend specifications where they do not have direct control over the mineral diesel quality.

There is much evidence to show what damage can be done to a diesel engine, fuel injection equipment and pollution control equipment by poor quality fuel; be it biodiesel, mineral diesel or any other type of diesel. For this reason all biodiesel must be produced to standard, and the DEH should be commended for their earlier work in establishing a biodiesel standard. Significant quantities of Biodiesel have been used in blends up to B100 in Europe for over 15 years. There are some issues with elastomers in engines over 10 years old but there is no evidence showing damage from biodiesel use where the biodiesel met specification at the time of use. On the contrary there is much evidence to support the claim that biodiesel offers benefits of reduced emissions, including NOx (feedstock dependant), lubricity, and carbon offset benefits that low sulphur diesel cannot offer.

There are many potential problems and we need to be mindful of this when discussing quality standards.

Blends may help with OEMs concerns over the use of poor quality biodiesel by ensuring that a blend meets the required parameters, however it would impose further market constraints on biodiesel producers by requiring further costly and time consuming testing regimes that would be difficult if not impractical to implement.

The idea of introducing specifications for blends is analogous to requiring cordial manufacturers to prove that their product meets specification after the end user blends the product with water. No product exists today where a manufacturer is responsible to prove their product meets specification after blending with ingredients that are not within their control. We do not control the mineral diesel and therefore cannot be held responsible for it to meet specification. If “in specification” biodiesel is blended with “in specification” mineral diesel in a clean and controlled environment the end product will be fit for purpose of fuel in a diesel engine.

Taxation

Ultimately we cannot accurately comment on the discussion paper until the biggest impact on the industry, rather the taxation position of blends is fully declared. We can only comment on the assumption that the taxation position does not change from its current form and therefore all comments from here on refer only to the situation with the fuel tax credits as they currently stand.

For example, should the taxation position change such that only a B5 is able to claim the full tax rebate, rather than blends meeting the diesel fuel standard, then a B20 blend standard will certainly not be required because no one will be blending to a B20. Biodiesel will only be sold at a B5 level in this instance.

The cleaner fuels grant was always intended to assist in the establishment of the Biofuels industry. The argument was that this grant would be handled via the tax excise system to provide a simple mechanism of managing and eventually reducing support as the industry became established, as in 2010 when the rebate grant begins to reduce. Unfortunately, the taxation department has interpreted this to mean that no net tax has been paid and therefore one cannot claim a fuel tax credit under these circumstances. The net effect is that mineral diesel has the same taxation benefits as biodiesel to the largest sector of the diesel market (large off road users) and hence there is no real Biofuels support. The industry is not being supported by the clean fuels grant, in fact it is actually being hindered by the complexity involved and administrative burden placed on customers whom use Biofuels.

The impact is that government changes to the fuel tax law rebates have indirectly stripped \$300M of investor's funds from the share prices of listed biodiesel companies.

Environmental emissions

We agree with the brief of the DEH in that "The principal reason for reviewing the need for standards is an environmental one": We would put it to you that introducing these additional standards would further inhibit the use of biodiesel and therefore increase the level of emissions into the environment. The current industry capacity is currently at 300-350ML per annum. It is estimated that the current off take is around 100ML/annum. There is 200-250ML of capacity available today that could produce biodiesel to offset emissions, and carbon, if the market barriers (mainly around taxation) were not in place causing difficulties in selling product to end users that are otherwise keen to use the product. This excess of current capacity has primarily been caused by the introduction of the change to the fuel tax credits on 100% biodiesel. We do not believe that more biodiesel would be used in the B100 form than it is today, but it would be blended without the need for a bonded and excise licensed site prior to sale making it easier to sell to new customers that are keen to use biodiesel.

The use of the spare biodiesel capacity that is currently available in Australia will lower the emissions produced from diesel engines, there is no argument in this regard^{1,2}. Introducing further blend standards will further inhibit the ability to develop market volumes to match existing capacity and future capacity coming on stream in 2007.

NOx emissions

It has now been proven³ that NOx emissions are directly related to the iodine value of the feedstock used. For an iodine value less than 80, NOx emissions will be lower than mineral

¹ Table 13 Percentage change of full life cycle air pollutant emissions, pp83 "Report of the Biofuels taskforce to the Prime Minister", Aug 2005.

² Figure IV .A.1-1, p.37. "A comprehensive Analysis of biodiesel impact on exhaust emissions". US EPA Oct 2002

³ Worgetter, M., Prankl, H., Rathbauer, J., Backovsky, D. "Local and Innovative Biodiesel. Final Report of the ALTENER project no 4 1030/c/02-022." P65 , Francisco Josephinum Wieselburg/Biomass Logistics Technology. Austria. . March 2006

diesel. Hence citing references to biodiesel made from rapeseed and Soya oil will always show increases in NOx emissions in comparison to mineral diesel. Using lower iodine value feedstock such as tallow used in Australia will actually reduce NOx emissions from diesel engines. Blending of feedstock allows control over the level of NOx produced relative to mineral diesel.

Why B20?

B5 and B20 do not need specifications. There are no blend specifications worldwide. “In specification” biodiesel and mineral diesel should automatically qualify as in specification Bx without further testing. Year after year of international trials show there are no issues using “in specification” biodiesel in any blend up to 100%, so why do we have to prove it meets a standard at a particular proportion. When biodiesel is used at levels <5% it should be regarded as an additive. There should be no limit on the upper blend above B5 provided it is labelled. A 20% limit is only in place due to the recent fuel tax changes. 20% was always intended as a starting position to enable contaminants built up in the fuel system to be flushed out or removed, and for customer confidence to improve, after which higher blends up to 100% would be used. The B20 limit is due to fuel tax credits only available for blends meeting the diesel standard. In some cases it may actually be possible to blend up to 30% biodiesel into mineral diesel and still meet the mineral diesel specification.

Problems can be encountered putting clean “in specification” biodiesel into dirty or wet tanks or dirty or wet mineral diesel. This dirt or water should not be there. Biodiesel manufacturers cannot be held responsible for this. It is however our responsibility to warn a customer that if they have dirt or water in their tanks it could cause problems. After changeover these problems will not build up as biodiesel will keep them clean. There should be a transition recommendation ie changing from straight mineral diesel to biodiesel blend should be a gradual process to clean all the contaminants out of the lines and tanks.

Labelling

For blends up to B5 why label at all. They are for all intensive purposes diesel and should not require labelling. There should be no limit on the upper blend above B5 provided it is labelled.

Our argument would be that blends of diesel meeting the fuel standard and blends of biodiesel meeting the biodiesel standard should be classed as meeting Australian fuel specifications.

The comparison to Ethanol is invalid. Ethanol limited to 10% is a different situation as higher than 15% ethanol can cause damage to the engine. Biodiesel can be blended in any proportion up to 100% and be safely used in engines provided the solvent properties of the biodiesel are adequately considered.

Engine Oil

Latest research under controlled conditions⁴ shows that there is no increased impact on engine oil over mineral diesel; in fact it is beneficial due to the lower particulate matter. Impact on lubricating oil is no worse than that of mineral diesel, particularly from biodiesel produced from low linolenic feedstock such as those found in Australia.

⁴ IBID

Blending

The blending requirements for heating biodiesel before blending are only applicable in very cold climates below 0 Centigrade. Splash blending is used successfully throughout the Australian biodiesel industry. B100 can be shipped to a customer who buys diesel at a discount to TGP and then splash blends on site. ARF also purchases diesel and splash blends biodiesel into it prior to shipment to the customer. Density tests conducted have shown that the two portions are completely miscible and after unloading at the customer's site the blend is homogeneous.

If we could ship B100 and blend on the customer's site without the taxation implications it would be easier to employ mechanical means. Unfortunately the Australian government's policy position on fuel tax credits prevents this.

Density

A density waiver should definitely be considered. However biodiesel must meet its specification and mineral diesel must meet its specification prior to blending, and an upper limit on density should be set at 0.89 on biodiesel blends.

Simply relaxing the density standard alone could open the opportunity to blending higher levels of lower grade fuel into the diesel that could give rise to higher aromatics or particulate matter.

Sampling and testing of blends

It should be sufficient for biodiesel and mineral diesel to be tested prior to blending and then infer that the blend is then of suitable quality.

It is not always practical to sample at or near the point of blending particularly if the customer has the benefit of discounted diesel fuel prices. In this instance sampling, testing and quarantine may have to be done at customer's remote site. We then must licence a customer's site for excise, install calibrated flow meters, obtain site plans, install secure fencing, put in place suitable security, a safety plan, and conduct safety audits. On top of this we will also be responsible for ensuring that the diesel is in standard before blending, not to mention the liability problems if something goes wrong.

We then have to isolate the product sample and ship the sample to a testing laboratory, test to show that it meets diesel standard at \$1000 per blend, plus either set up a laboratory at each site or wait 3 days (\$65,000 on 99ML@8% cost of WC) to send the sample to a test laboratory.

If a customer could claim a fuel tax credit for any blend of biodiesel/mineral diesel as prior to July 06 none of this would be required as the customer could blend any portion he so desires and use as straight diesel without the financial loss he would now face.

If suitable tests can then be developed, testing may require the purchase of additional and usually very expensive testing equipment. If the DEH wishes to impart these requirements on biodiesel manufacturers then the department should compensate for the costs of the producer to undertake these tests.

Upgrades/cleaning for blends

Why should biodiesel manufacturers be responsible for contaminants, dirt and water in the existing fuel system caused by mineral diesel contamination?

We do not support the concept that extensive upgrades are required to storage facilities for B20. Provided the existing infrastructure used for diesel storage is inspected and does not contain gross contaminants simple cleaning is all that is required. We do support the use of filters as insurance against existing contaminants causing problems in the system. Again this could form part of a code of practice for changeover to blends.

OEM warranties

B5 may increase confidence in OEM's however, most OEMs do not warrant against damage caused by mineral diesel fuel. Fuel companies warrant the fuel against damage to the vehicles caused by the fuel. The warranty issue therefore does not seem to be relevant. The issue seems more related to OEM and customer education.

Oxidative stability - Shelf life

The US is currently reviewing the need for a blend standard. The main reason for this is the oxidative stability. The circumstances in the US are different from Australia.

Oxidative stability is a function of the fatty acids found in the feedstock. In the US the main feedstock is Soya oil, in Europe it is rapeseed oil, in Australia it is tallow and canola. The fatty acid profiles of these feedstock oils differ dramatically.

It has been well researched in the edible oil industry that oxidative stability is a function of the degree of unsaturated fatty acids. In order of preference is saturated, mono unsaturated, and less preferred polyunsaturated. In particular it is a function of the Linoleic (C18:2), and more importantly the Linolenic (C18:3) acid content. Linoleic has up to 48 times, and Linolenic acid has up to a 100 times the oxidation rate of Stearic acid such as found in tallow⁵.

Rapeseed and Soya both have higher levels of linolenic fatty acid. Tallow has a very saturated fatty acid profile and is therefore a naturally stable product. Stability issues exist with Soya and Rape. Canola has a better stability due to more stable olefins or more specifically lower linolenic acid content.

The claim of six months shelf life is valid given the lack of data to support an alternative, but it should be flexible and be able to be extended as historical data comes to hand. If we can show that the stability of the biodiesel is in excess of this it should be extended. Most data is based on Soya or rape. Tallow based biodiesel has oxidative stability far in excess of either of these.

Another factor is the type of technology employed in the biodiesel process. We use crude canola that still has natural antioxidants that have not been removed through high temperature refining and deodorizing processes, and tallow that is naturally more stable. Other processes utilize refined, bleached and deodorized oils that have natural antioxidants removed, or employ distillation that removes the antioxidants during processing.

⁵ Table 2.7 p 138 relative rates of oxidation of fatty acids "Bailey's Industrial Oil and Fat Products",. Edited by Swern, Fourth edition, Wiley

To reiterate our position and directly respond to the questions posed in the discussion paper:

Option 1 – B5 limit and extensive testing

Option 2 – B5 limit with density waiver and excise testing

Option 3 – B20 limit with a strict B20 standard and testing

Option 4 – B20 limit with a simplified B20 standard and testing

Should biodiesel blends be capped at B5 and meet the diesel standard?

No. This will significantly limit the market size in an industry that is already finding difficulty growing. We believe that this could only be considered if Australia places a mandate on B5 or employed some other means to offset the imposed limit to the market size, plus provide protection from imports. It should be pointed out that biodiesel currently does not enjoy the protection from imports that ethanol does. Imported biodiesel enjoys the same assistance as does biodiesel produced locally.

Options 1 and 2 both create an additional indirect market barrier. They both still require post blend testing to confirm that they meet the fuel quality standard. This is neither necessary nor warranted and difficult and costly to undertake.

Should flexibility be allowed for density (or any other quality parameter)?

Density should definitely be allowed up to the density of biodiesel. However for option 2 the biodiesel must meet Biodiesel specification and the mineral diesel must meet Mineral diesel standard specification prior to blending and an upper limit of 0.89 (density of biodiesel) should be set on biodiesel blends.

Without this precaution, a general density waiver could open the opportunity for operators blending higher levels of lower grade fuel into the diesel that could give rise to higher aromatics or particulate matter and do further harm to the environment.

Is option 1 or 2 your preferred management option?

Option 2 with a density waiver is preferred over Option 1 but neither option is favoured due to the requirement for additional testing after blending which puts in place further market barriers to sales of biodiesel.

Should a full B20 fuel quality standard be developed as outlined in option 3

No other country in the world has found the need to introduce a blend standard though some are working towards this where the feedstock conditions leading to oxidation is causing problems. The conditions are different in Australia with different feedstock. B20 is compatible with components in modern engines. B20 does not increase NOx emissions if made from suitable feedstock with an iodine value less than 80.

A Bxx standard where XX is in the range 6-20 is more acceptable. This enables blending of biodiesel in proportions to maintain the cold flow properties.

Standards need to be developed, and tests need to be developed that are valid for use on blends and verified far before this can be done, if at all.

It is not always practical to sample at or near the point of blending.

If so, which parameters should be included?

NA

Should a simplified B20 standard be developed as outlined in Option 4?

We believe the test regimes listed are hardly less extensive. They are still too onerous on the biodiesel producer.

The integrity of the current test methods would be compromised and therefore this is not practical.

If so which parameters should be included?

If quick and easy tests can be developed:

Biodiesel content? To provide surety to the consumer they are buying biodiesel.

Filter blocking tendency.? To ensure the blend does not block filters.

Moisture ? - To ensure the mineral diesel does not contaminate the biodiesel portion.

flash point? – for safety if light fractions are blended.

Again biodiesel and mineral diesel should both meet standards prior to blending.

Should a B5 only cap be adopted or should both B20 and B5 blends be permitted?

It depends on what the taxation point of view will be on these blends. What will be their taxation position with respect to Fuel tax credit? We cannot adequately comment until this position is known.

As a biodiesel producer we cannot control the mineral diesel fuel and therefore any blend standard that requires testing imposes further market barriers.

Are there other management options that should be considered?

We do not support the concept that extensive upgrades are required for B20. Provided the existing infrastructure used for diesel storage is inspected and does not contain gross quantities extensive cleaning is not required, and that a transition code of practice would be more appropriate. We do support the use of filters as insurance against existing contaminants causing problems in the system.

Another option might be a Quality system implementation that is third party accredited and audited. This would enable us to provide surety to the market of the quality supplied.

Should B5 blends be labelled?

Not mandatory. It should be permitted that up to 5% biodiesel is for all intensive purposes identical to diesel and therefore labelling is not required.

The public was not told about lead in petrol, not told about MTBE, why when we wish to add up to 5% biodiesel do we have to label it. The only difference is that traditional petroleum companies are not making it. We do not believe that it is the same as the ethanol debate. With ethanol, greater than 15% ethanol can cause engine damage. There is no evidence after 15 years that quality B100 will harm a diesel engine.

If so, is a statement that the fuel “contains 5% biodiesel” or “up to 5% biodiesel” sufficient?

If the DEH decides that it is warranted then it is ARF’s view that “up to” would be the correct form to use. If “contains 5%” is used this again imposes upon the industry for further testing to confirm that it always has 5% biodiesel. “Up to” gives more flexibility in the industry and does no harm.

If a prescriptive amount is intended then it should have a large variation limit imposed for practicality reasons ie $\pm 2\%$.

**Comments on labelling requirements for higher blends of diesel and biodiesel
Should higher blends and neat biodiesel (B100) be labelled?**

Yes higher blends should be labelled with “This fuel contains biodiesel” or similar for blends over 5%. This ensures that older vehicles that may have older style hoses and gaskets are not damaged by the cleansing nature of biodiesel, and that the public is fully informed.

If so, is statement of the biodiesel content (eg “this fuel contains 20% vol biodiesel”) sufficient?

If the DEH decides that it is warranted then it is ARF’s view that “up to” would be the correct form to use. If “contains 20%” is used this again imposes upon the industry for further testing to confirm that it always has 20% biodiesel. Up to gives more flexibility in the industry and does no harm. B20 should contain between 6 and 20% biodiesel at all times.

If a prescriptive amount is intended then it should have a large variation limit imposed for practicality reasons ie $\pm 2\%$.

Is additional information (on labelling) required? If so what information should be included on a label for higher blends of biodiesel?

Customers should be advised to check with OEMs on the use of biodiesel in their vehicles.

Other comments

We do not see the point of introducing new standards if the current fuel standards are not adequately policed and applied.