

SETTING NATIONAL FUEL QUALITY STANDARDS

Proposed Standard for Fuel Parameters (Biodiesel)

COMMONWEALTH POSITION

August 2003

1 INTRODUCTION

In March 2003, the Minister for the Environment and Heritage, the Hon Dr David Kemp MP released a discussion paper¹ on setting an Australian fuel quality standard for biodiesel. The development of a fuel quality standard will promote biodiesel quality in the market place, certainty for the biodiesel industry and consumer confidence in the product.

The discussion paper was intended to inform stakeholders about biodiesel and its use as a transport fuel. The discussion paper did not recommend limits for biodiesel parameters nor advocate the use of particular blends of biodiesel. Stakeholder comment was requested on a series of technical issues relevant to the development of the standard as well as issues relating to blending and labelling.

The formal public consultation period on the discussion paper closed on 23 May 2003. The forty submissions received have been taken into consideration by the Commonwealth in developing a proposed Australian biodiesel fuel quality standard.

This paper sets out the Commonwealth's preferred position on:

- a proposed Australian biodiesel fuel quality standard;
- biodiesel blends; and
- biodiesel labelling provisions.

The objective of this paper is to seek stakeholder comment on the Commonwealth's position prior to setting the standard in legislation. This position paper will also briefly detail the links between the standard setting process and the recent Government budget announcements.

Written comments are requested on the Commonwealth position paper by no later than **noon Friday 15 August 2003** and should be sent to:

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The Department of the Environment and Heritage
GPO Box 787
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Or submitted electronically to: fuel.quality@ea.gov.au

Unless marked as confidential, all submissions will be treated as public documents and posted on the Department of the Environment and Heritage's website. The Department of the Environment and Heritage will not post any personal details on the website. Please ensure that your submission is attached as a separate document when replying by email.

¹ *Setting National Fuel Quality Standards, Paper 6, National Standard for Biodiesel*, March 2003

2 COMMONWEALTH POSITION

Setting the standard

The biodiesel discussion paper (*Setting National Fuel Quality Standards Paper 6 National Standard for Biodiesel*) sets out the general principles and policy requirements for setting fuel quality standards.

It should be noted that the European draft biodiesel standard CEN prEN 14214 includes the majority of parameters specified in the US biodiesel standard ASTM D6751-02a, and the respective limits for these parameters are the same or very similar. However the standards do differ slightly in their intended application and in the preferred test methods.

The European prEN14214 specifies requirements and test methods for marketed and delivered fatty acid methyl esters (FAME) to be used either as automotive fuel for diesel engines, at 100% concentration, or as an extender for automotive fuel for diesel engines, in accordance with the requirements of EN 590. EN 590 is the European automotive diesel standard. The use of biodiesel in Europe is predominantly B100 and/or low blends (B5 or less).

The US ASTM D6751-02a specification covers low sulfur biodiesel (B100) for use as a blend component with diesel fuel oils. Most of the experience with biodiesel in the US has been with 20% blends of biodiesel with 80% diesel. The market share is approximately 75% B20, 24% B5/2 and 1% B100.

After consideration of comments received on the public discussion paper, the Commonwealth has prepared a position on an Australian biodiesel standard. The proposed standard is summarised in Table 1. It is proposed that the Australian biodiesel standard will apply to neat biodiesel (B100) for use as automotive fuel and biodiesel intended for use as blend stock/extender with automotive diesel. In general terms, the parameters in the proposed biodiesel standard harmonise with the draft CEN prEN 14214 biodiesel standard to a certain extent, and therefore, by default, with many of the parameters in the US ASTM D6751-02a biodiesel standard.

The rationale for the proposed standard is based on the objective of setting a biodiesel fuel quality standard that allows for optimum vehicle and environmental performance. Harmonisation with international standards has been achieved while taking into consideration the practical use of biodiesel in the market including factors such as the origin of diesel vehicles in Australia and the intended use of biodiesel. Biodiesel will be used in Australia as both B100 and as blend stock/extender.

The suite of parameters proposed for implementation on 18 September 2003 will ensure a quality biodiesel product enters the Australian market. As the biodiesel industry will need time to access quality analysis infrastructure, establish analytical techniques and gain accreditation for some test methodologies, it is proposed that there will be a progressive introduction of further parameters over time. This approach has previously been successfully adopted for automotive diesel and unleaded petrol.

Table 1 - Proposed Australian Biodiesel Standard

Parameter	Standard	Test Method	Date of effect
Sulfur	50 ppm (max)	ASTM D5453	18 Sep 2003
	10 ppm (max)		1 Feb 2006
Density	860 to 890 kg/m ³	ASTM D1298	18 Sep 2003
Distillation T90	360°C (max)	ASTM D1160	18 Sep 2003
Sulfated ash	200 ppm (max)	ASTM D874	18 Sep 2003
Viscosity	3.5 to 5.0 cSt @ 40°C	ASTM D445	18 Sep 2003
Flashpoint	120.0°C (min)	ASTM D93	18 Sep 2003
Carbon residue (10% distillation residue) (100% distillation sample)	0.30 % mass (max) OR 0.05 % mass (max)	EN ISO 10370 ASTM D4530	18 Sep 2003
Water and sediment	0.05 % vol (max)	ASTM D2709	18 Sep 2003
Copper strip corrosion (3 hrs @50°C)	Class 1 (max)	EN ISO 2160	18 Sep 2003
Ester content	96.5 % mass (min)	prEN 14103 (FAME)	18 Sep 2003
Phosphorus	10ppm (max)	ASTM D4951	18 Sep 2003
Acid value	0.80 mgKOH/g (max)	ASTM D 664	18 Sep 2003
Total contamination	24 ppm (max)	EN 12662 ASTM D5452	18 Sep 2004
Free glycerol	0.02 % mass (max)	ASTM D6584	18 Sep 2004
Total glycerol	0.25 % mass (max)	ASTM D6584	18 Sep 2004
Cetane number	51 (min)	EN ISO 5165 ASTM D613	18 Sep 2004
Cold Filter Plugging Point	TBA	EN 116 ASTM D4539	18 Sep 2004
Oxidation stability	6 hours @ 110°C (max) (pending BIOSTAB)	prEN 14112 (<i>Rancimat</i>) ASTM D2274 (modified)	18 Sep 2004
Alkaline metals	≤ 5mg/kg Group I (Na, K) ≤ 5mg/kg Group II (Ca, Mg)	prEN 14108, prEN 14109 (Group I) prEN 14538 (Group II)	18 Sep 2004
Alcohol content	< 0.20 % (m/m)	ASTM (TBA) prEN 14110	18 Sep 2004

TBA – to be announced.

An explanation of the rationale behind the choice of parameters and the related limits and test methods is provided in Table 2.

Table.2 – Standard setting rationale

Parameter	Standard	Test Method	Date of Effect	Comment
Sulfur	50 ppm (max) 10 ppm (max)	ASTM D5453	18 Sep 2003 1 Feb 2006	B100 is essentially sulfur free. This limit is tighter than the US and slightly less stringent than the draft European standard. The 50ppm limit meets the ultra low sulfur limit set for diesel in 2006 and for the ULSD limit to attract lower rates of excise from 1/7/03. The 10ppm limit in 2006 will meet Euro 5 standards.
Density	860 to 890 kg/m ³ @ 15°C	ASTM D1298	18 Sep 2003	This limit is based on the European standard. This parameter is not specified in the US standard.
Distillation T90	360°C (max)	ASTM D1160	18 Sep 2003	This limit is based on the US standard. This parameter is not specified in the European standard.
Sulfated ash	200 ppm (max)	ASTM D874	18 Sep 2003	This limit is based on both European and US standards.
Viscosity	3.5 to 5.0 cSt @ 40°C	ASTM D445	18 Sep 2003	This limit is based on the European standard.
Flashpoint	120.0°C (min)	ASTM D93	18 Sep 2003	This limit is based on the EU standard. Specifying flashpoint will limit the level of unreacted alcohol remaining in the finished fuel.
Carbon residue (10% distillation residue) (100% distillation sample)	0.30 % mass (max) OR 0.05 % mass (max)	EN ISO 10370 ASTM D4530	18 Sep 2003	Either limit is suitable for ensuring quality of the biodiesel. The limit based on 10% distillation residue is based on the European standard and the limit based on 100% distillation is based on the US standard. The limit is dependent on method used to test for the parameter.
Water and sediment	0.05 % vol (max)	ASTM D2709	18 Sep 2003	This limit is based on both European and US standards.
Copper strip corrosion (3 hrs @50°C)	Class 1 (max)	EN ISO 2160	18 Sep 2003	This limit is based on the European standard.

Ester content	96.5 % mass (min)	prEN 14103	18 Sep 2003	This limit is based on the European standard. This parameter is not specified in the US standard. The test method is based on FAME. It is envisaged that methanol will be the alcohol of choice for biodiesel production at this stage. The test method may need to be reviewed with the development of Gas Chromatograph (GC) methods.
Phosphorus	10ppm (max)	ASTM D4951	18 Sep 2003	This limit is based on both European and US standards.
Acid value	0.80 mgKOH/g (max)	ASTM D 664	18 Sep 2003	This limit is based on the US standard. This parameter is currently being reviewed.
Total contamination (1)	24 ppm (max)	EN 12662 ASTM D5452	18 Sep 2004	This limit is based on the European standard. This parameter is not specified in the US standard. A referee test method needs to be chosen.
Free glycerol	0.02 % mass (max)	ASTM D6584	18 Sep 2004	This limit is based on both European and US standards.
Total glycerol	0.25 % mass (max)	ASTM D6584	18 Sep 2004	This limit is based on the European standard (the US standard is 0.24 %mass).
Cetane Number (2)	51 (min)	EN ISO 5165 ASTM D613	18 Sep 2004	This limit is based on the European standard. This limit requires a cetane engine for testing. A referee test method needs to be chosen.
Cold filter plugging point (3)	TBA	EN 116 ASTM D4539	18 Sep 2004	The limit needs to be developed for Australian conditions. A referee test method needs to be chosen.
Oxidation stability (4)	6 hours @ 110°C (max) (pending BIOSTAB)	prEN 14112 (<i>Rancimat</i>) ASTM D2274 (modified)	18 Sep 2004	This limit is based on the European standard. This parameter is not specified in the US standard. This limit is provisional pending release of results from BIOSTAB. This limit and test methods will be reviewed when more information is available. A referee test method needs to be chosen.

Alkaline metals	≤ 5mg/kg Group I (Na, K) ≤ 5mg/kg Group II (Ca, Mg)	prEN 14108, prEN 14109 (Group I) prEN 14538 (Group II)	18 Sep 2004	These limits are based on the European standard. This parameter is not specified in the US standard.
Alcohol content	< 0.20 % (m/m)	ASTM (TBA) prEN 14110	18 Sep 2004	The European standard sets this limit specifically for methanol content. This parameter is not specified in the US standard. It is envisaged that methanol will be the alcohol of choice for biodiesel production at this stage. A referee test method needs to be chosen. The test method may need to be reviewed with the development of Gas Chromatograph (GC) methods.

Note: Test methods with prefix “pr” are draft test methods in development with prEN 14214.

(1) Total contamination – As some stakeholders have indicated that they plan to use acid catalysts and waste cooking oils as feedstock, the inclusion of this specification is relevant. The European prEN 14214 standard specifies EN 12662 test method for determining total contamination. Further improvement of the method or a modification is necessary to get the precision required hence the inclusion of ASTM D5452. The Department of the Environment and Heritage is seeking further technical advice on the appropriate referee test method.

(2) Cetane number – The cetane number measures the readiness of a fuel to auto ignite when injected into the engine. It is also an indication of the smoothness of combustion. In a compression ignition diesel engine the cetane number is the measure of ignition promotion. The cetane number is not to be confused with the cetane index, which is not applicable to biodiesel. Cetane indices predict the cetane number from equations derived for petroleum distillates only. Testing for Cetane number requires a Cetane engine. The Department of the Environment and Heritage has been informed that there is no cetane engine in operation in Australia. A cetane engine costs approximately \$0.5million, and requires substantial experience to operate properly and consistently. The Commonwealth proposes to delay this specification until September 2004 to allow for this requirement to met by industry.

(3) Cold filter plugging point – Limits for this specification need to be developed for the Australian climate. This specification is also being considered for the *Fuel Standard (Automotive Diesel) Determination 2001* i.e. the national diesel standard. These parameters are currently being considered by the Department of Industry, Tourism and Resources.

(4) Oxidation stability – The Department of the Environment and Heritage will review results of the European BIOSTAB study when complete and seek further technical advice on this specification.

Biodiesel Blends

The Commonwealth proposes to set a quality standard that applies to neat biodiesel (B100). Both biodiesel that will be used neat and biodiesel that will be used as blend stock/extender with automotive diesel fuel must meet this standard. When blending biodiesel with automotive diesel, the automotive diesel portion will be required to meet the *Fuel Standard (Automotive Diesel) Determination 2001* and the biodiesel portion will be required to meet the proposed *Fuel Standard (Biodiesel) Determination 2003*.

Blending biodiesel with automotive diesel in small proportions (less than or equal to 5%) should have limited impact on the quality characteristics of the automotive diesel fuel. The European EN590 automotive diesel standard has been amended to allow for inclusion of 5% FAME.

The Department of the Environment and Heritage will conduct fuel quality tests on automotive diesel and biodiesel blends to determine the impact of blending on both automotive diesel and biodiesel quality characteristics and determine if an amendment to the *Fuel Standard (Automotive Diesel) Determination 2001* (to allow for 5% biodiesel) is appropriate. It is anticipated that this testing will be completed by the end of 2003. The outcome of the testing will be used to inform the Commonwealth's position on appropriate biodiesel blend levels.

If a proposal to amend the Australian diesel standard along similar lines to the European diesel standard is developed, broad stakeholder consultation will occur in particular with the petroleum industry, vehicle manufacturers and consumer groups e.g. the ACCC, the AAA, etc.

Labelling - Fuel Quality Information Standard

There is strong stakeholder support for labelling of biodiesel. The Commonwealth's *Fuel Quality Standards Act 2000* (FQSA) is currently being amended to provide the Minister for the Environment and Heritage with the power to set Fuel Quality Information Standards, which could be used to require information about fuel to be provided at the point of sale. It is currently anticipated that these amendments to the FQSA will be considered by Parliament during the Spring sittings this year. These amendments may or may not pass at this time.

It is proposed that the objects of the Act be amended to include objective (b), as set out below.

The objects of the Act are to:

- (a) regulate the quality of fuel supplied in Australia in order to:
- reduce the level of pollutants and emissions arising from the use of fuel that may cause environmental and health problems;
 - facilitate the adoption of better engine technology and emission control technology; and
 - allow the more effective operation of engines.

(b) ensure that, where appropriate, information about fuel is provided when the fuel is supplied.

The proposal set out below is preliminary and subject to further consultation and amendment.

Table.3 – Proposed Biodiesel Information Standard

Parameter	Requirements
Information	<p>Where Biodiesel exceeds 5% by volume of the fuel blend a label must include the following information:</p> <ul style="list-style-type: none"> - this fuel contains up to X% biodiesel^A. - the use of biodiesel and biodiesel blends may decrease fuel economy compared with using 100% diesel. - check your vehicle handbook, fuel supplier information or your vehicle manufacturer for further information on the suitability for use in your vehicle. <p>Where 100% Biodiesel is supplied/sold a label must include the following information:</p> <ul style="list-style-type: none"> - this fuel contains 100% biodiesel. - the use of biodiesel and biodiesel blends may decrease fuel economy compared with using 100% diesel. - check your vehicle handbook, fuel supplier information or your vehicle manufacturer for further information on the suitability for use in your vehicle.
Placement	Labels must be placed in a conspicuous position facing the consumer on the fuel pump/dispenser.
Size	TBA
Shape	TBA
Font	TBA
Colour	TBA

^AThis provision allows for residual fuel in distribution and dispensing systems/infrastructure and for minor variations in blend strength noting that the final blend must not exceed the stated upper limit on the label.

Other issues

There were several other issues raised in response to the discussion paper. The Commonwealth has taken the following position on these as set out below.

Feedstock

Various feedstocks can be used to produce biodiesel. These can be determined and/or restricted through the quality standard. For example, the draft European standard sets an iodine value limit which restricts certain types of feedstocks. The Commonwealth’s proposed fuel quality standard for biodiesel is not intended to

restrict the type of feedstock used, as long as the biodiesel produced meets the standard.

Alcohol

Various alcohols can be used to produce biodiesel. These can be determined and/or restricted through the quality standard. For example prEN 14214 is a standard for fatty acid methyl esters (FAME), which therefore infers that methanol must be used as the alcohol feedstock. The Department of the Environment and Heritage understands that methanol will probably be the alcohol of choice for economic and efficiency reasons, however the proposed standard will not restrict the type of alcohol used as long as the resultant fuel meets the standard. The standard will be restrictive on the amount of residual alcohol as per international standards.

Vehicle Warranties

Labelling will require information relating to warranties.

3 BIOFUELS POLICY

In May 2003 the Minister for the Environment and Heritage, The Hon Dr David Kemp MP and the Treasurer, the Hon Peter Costello MP announced a comprehensive package of Budget measures to support the production and use of biofuels.

The new biodiesel arrangements include:

- from 18 September 2003, Government will apply excise on biodiesel – whether pure or blended – at the same rate as diesel;
- providing domestic biodiesel producers and importers with a subsidy of 38.143 cents/litre until 30 June 2008, with a nett effective excise rate for biodiesel of zero over this period;
- adjusting the nett effective excise rate for biodiesel in a series of five even annual steps, commencing on 1 July 2008 and ending on 1 July 2012;
- setting a fuel standard for biodiesel, after which biodiesel will be listed as an eligible alternative fuel for on-road grants under the Energy Grants Credit Scheme; and
- setting a new excise rate that will apply to biodiesel from 1 July 2012.

The effective nett excise rate will be set later this year, having regard to energy content and the assessment of environmental and other benefits.