



FEDERATION OF PETROLEUM SUPPLIERS LTD

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FPS BRIEFING NOTE

BIODIESEL

What is Biodiesel?

The abbreviated technical description of Biodiesel is FAME [Fatty Acid Methyl Esters]. Commercial Biodiesel is a mixture of the methyl esters produced from fatty acids present in certain vegetable oils by means of a chemical process [‘transesterification’].

The raw material for Biodiesel can be a virgin oil, expressed from plant seeds, or recovered vegetable oil [RVO] from cooking processes. Because of their characteristics, only a limited number of vegetable oils are suitable for conversion to Biodiesel and usually rapeseed or sunflower oil is used, although a number of other oils, and even animal fats, could be suitable.

Virgin oil is a relatively expensive raw material for Biodiesel production and current practice is to use RVO, suitably treated to eliminate variations in its composition caused by hot cooking process and by compounds derived from cooked food.

The transesterification process, common to both virgin and recovered oils, uses methanol and an alkali to replace glycerol in the oil with methyl groups and requires careful laboratory control to ensure consistent quality; without this control, the product may contain soaps, free glycerol, residual alkali, unreacted methanol or excess water – any of which could prove disastrous in a modern diesel engine.

It is stressed that any company not having a modern chemical plant and sophisticated laboratory facilities cannot make reliable Biodiesel.

Quality and use issues

The quality of FAME for diesel engines is given in a European Standard [EN 14214], which specifies values for the critical parameters that determine its suitability for use at 100% and as a blending component in ULSD; this Standard was developed with the full co-operation of vehicle, and vehicle component, manufacturers and specifies the only quality of Biodiesel acceptable to them for vehicle warranty validation.

At present, only a restricted number of specific models can use 100% FAME and, for most diesel vehicles, a 5% blend in ULSD is the maximum acceptable level. A forthcoming revision of the European Standard for automotive diesel [EN 590] will allow up to 5% FAME to be included *without being identified as present*.

It is claimed that, at the 5% level of inclusion, a measurable reduction in CO₂ and particulate emissions is achievable, together with a slight improvement in fuel consumption.

The use of 100% FAME [or unprocessed vegetable oil] in a modern diesel engine not specifically designed to use this can result in damage to rubber and plastic components and the clogging of filters and/or injectors.

It is essential that only FAME to BS EN 14214 be purchased for resale as 'Biodiesel 100%' and/or for blending into ULSD [at 5% maximum] if vehicle warranties are to be upheld.

Storage and blending

Particular care must be taken when storing and blending FAME.

The material can take up water from the atmosphere [it is 'hygroscopic'] and may then form an emulsion and/or develop mould growth; even a moderate amount of water uptake can take the material, or a subsequent blend, out of specification.

As an unsaturated organic compound, FAME is prone to oxidation, with possible resulting gum formation, and long-term or over-ventilated storage should be avoided.

The cold filter plugging point [CFPP] of FAME is significantly higher than that of most mineral fuels and storage at low temperatures can lead to the separation and/or precipitation of some constituents ['waxing'].

The density of FAME is slightly higher than that of ULSD and thorough mixing is required when blending to avoid the formation of strata with differing compositions.

FAME is suitable only for blending with fuels intended for use in compression ignition engines.

Retailing

Biodiesel currently carries 20p/litre less duty than ULSD, but this is based on a 100% FAME content; in a 5% blend, this duty reduction falls to just 1p/litre. At this level of taxation, the production of Biodiesel from virgin oil obtained from seed crops cannot be regarded as fully economic.

Customs & Excise has not specified adequately the criteria necessary to qualify for the duty reduction and inferior products can currently receive this without question.

According to the British Standard [BS EN 14214] implementing the European Standard for FAME, the description 'Biodiesel' may only be used for the pure product and must be followed by '100%'; the 'colour coding' for this product on the forecourt is recommended to be orange.

With the introduction of a revised edition of EN 590 for automotive diesel, allowing the inclusion of up to 5% FAME, there will be no marking or colour coding requirements specified to indicate that a blend at, or below, this level is anything other than conventional ULSD.