Forecourt Equipment Federation

…The leading association for equipment manufacturers and their servicing divisions, serving the UK retail petroleum market…

Guidance to Retailers and Maintenance Companies on the Introduction of Low Blend Biofuels to UK Filling Stations

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The Forecourt Equipment Federation (FEF) is the representative body for equipment manufacturers, and their service divisions, serving the UK retail fuel delivery market. It provides a forum for the industry to share and exchange information on developments in the fuel delivery process and aims to be an authoritative voice on industry issues.

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In creating this document the FEF acknowledge documents referenced in the Bibliography.

Further copies in pdf format can be obtained from the FEF and its members.

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2 FOREWORD

This document provides guidance to retailers and maintenance companies on the introduction of low blend biofuels onto UK Filling Stations. For the purposes of this document, low blend biofuels are deemed to be:

- Unleaded petrol products with a bioethanol content, which are in conformance with EN228:2004. These include a 5% (nominal) ethanol blend often referred to as E5.

- Diesel products with a biodiesel content, which are in conformance with EN590:2004. These include a 5% (nominal) biodiesel blend often referred to as B5.

Whilst aimed at Filling Stations open to the general public for the fuelling of motor vehicles, this guidance may also be of use on private installations or other fuel dispensing operations.

This document currently does not deal with diesel products blended with ethanol.

3 BIBLIOGRAPHY

EN 228:2004 Automotive Fuels – Unleaded Petrol - Requirements and Test Methods.
EN 590:2004 Automotive Fuels – Diesel - Requirements and Test Methods.
EC Directive on the promotion of the use of biofuels or other renewable fuels for transport, 2003/30/EC, OJ L123 17.5.2003 pp42/46.
Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH) [SI 2002 No.2677].
EN 15376 Automotive Fuels - Ethanol as a Blending Component for Petrol - Requirements and Test Methods.
EN 14214:2003 Automotive Fuels – Fatty Acid Methyl Esters (FAME) for Diesel Engines – Requirements and Test Methods.
The Measuring Instruments (Liquid Fuels and Lubricants) Regulations 2006 [SI 2006 No.1266].
The Measuring Instruments (Liquid Fuels and Lubricants) (Amendment) Regulations 2006 [SI 2006 No.2234].

4 DEFINITIONS

B5	Blend of 5% (nominal) biodiesel with diesel.
D5	Blend of 5% (nominal) ethanol with diesel.
E5	Blend of 5% (nominal) ethanol with unleaded petrol.
COSHH	Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH) [SI 2002 No 2677].
OEM	Original Equipment Manufacturer.

It should be noted that the blend percentages referenced in the fuel standards relate to volume/volume ratios, whereas the Biofuels Directive defines the requirement for renewable transport fuels as being measured in percentage of energy content. This may lead to the final v/v percentage level of ethanol and biodiesel content in fuels at the end of the Directive's transition period being a higher numerical value than the number quoted as the required percentage energy content.

INTRODUCTION

During 2008-2009, petrol retailed at Filling Stations in the UK is expected to contain a low percentage of blended bioethanol. Similarly, diesel will start to contain a low percentage of blended biodiesel.

Where the percentages introduced are within the 5% limit for fuel to remain in accordance with EN228:2004 for petrol, and EN590:2004 for diesel, the products may continue to be retailed under their existing grade names, and be loaded into the same storage tanks as existing regular unleaded petrol and diesel. Labelling of dispensers should continue to conform to the requirements laid down in The Measuring Instruments (Liquid Fuels and Lubricants) Regulations 2006 and The Measuring Instruments (Liquid Fuels and Lubricants) (Amendment) Regulations 2006; but there may in practice be no change required.

The FEF recommend that retailers should take now some specific actions related to their equipment and be prepared for the introduction of low blend biofuels. This document sets out guidance.

This document also provides guidance to service companies on maintenance actions that will need to be performed during the transition period to low blend biofuels. It also defines some symptoms that may be an indication that problems exist requiring more detailed investigation.

5 ADVICE FOR RETAILERS

Determining Suitability of Equipment

The introduction of ethanol into petrol and biodiesel into diesel can bring some material compatibility issues, particularly if there is an opportunity for water to be introduced into low blend biofuels as this can raise the acidity of the fuel.

The electrical conductivity of biofuels is higher than that of existing unleaded petrol and diesel products, and this in turn can bring increased corrosion risk from galvanic reactions where particular material combinations are present.

The bio-content of the fuels may mix with water, and this may for example have an impact on some types of tank level gauge and their ability to correctly determine the water level in the tank.

Therefore retailers are advised to contact OEMs to ensure the suitability of their forecourt equipment with low blend biofuels. This includes:

- Tanks.
- Tank liners.
- Tank gauging equipment.
- Submerged pumping units.
- Pipework.
- Dispensers.
- Interceptors.
- All other ancillary equipment.

Special biodiesel hoses should be used when the percentage of biodiesel is 20% or higher.

Certification and Calibration

For fuels which are within the specification of EN228:2004 for unleaded petrol, and EN590:2004 for diesel, existing safety certification for equipment in potentially explosive atmospheres is likely to remain valid. Existing Weights and Measures certificates are very likely to remain valid. Existing certificates for Stage II vapour recovery systems are likely to remain valid.

For the introduction of low blend biofuels, it is unlikely that any meter recalibration will be required to dispense the new fuels.

Nevertheless, advice should be sought from OEMs.

Tank Gauging

It is recommended that retailers pay close attention to the tank gauge operation during the transition period to low blend biofuels to verify that the equipment is working correctly. Any apparent discrepancies should be thoroughly investigated.

Maintenance Issues, and being aware of the Transition to Biofuels

Ethanol and biodiesel are good cleaning agents. Therefore the introduction of low blend biofuels may result in an increased release of debris from tank walls, and possibly from pipework. In this event, an increased amount of debris will be captured by the dispenser filters.

It is recommended that filters are exchanged, if possible, before the first introduction of low blend biofuels to a site. Some dispenser manufacturers may recommend the filter type and mesh to be modified prior to the introduction of low blend biofuels.

Increased maintenance/exchange of dispenser filters may be required during the transition period to low blend biofuels.

Ensure that the maintenance company examines any blocked filters in accordance with Section 7 of this document in order to determine whether the debris indicates a possible fuel or storage tank problem.

In order that retailers know when to increase vigilance on checking continued correct operation of equipment, and when to commence filter exchanges, they should request information on the content of biofuel in each fuel delivery received.

Under normal circumstances, the need for more regular filter exchanges should diminish once low blend biofuels are fully established.

There is a possibility that low blend biofuel and non-low blend biofuel deliveries may be received by retailers during the transition period – the switch to low blend biofuels might not be clear cut.

Material Safety Data Sheets

In order to keep site Health and Safety records up to date, and maintain compliance with COSHH regulations, retailers should request and keep copies of material safety data sheets for the low blend biofuels.

Symptoms

Reduced dispenser flow rate or increased pumping unit noise may indicate a blocked filter.

Wet stock reconciliation problems could possibly relate to the unsuitability of the tank gauge for use with low blend biofuels.

Leakage may occur as a result of the new fuels, regularly check the internals of the dispensing equipment for signs of leakage.

7 GUIDANCE FOR MAINTENANCE COMPANIES

When exchanging filters, the debris in the filter should be inspected.

Any debris should be consistent with loosened material or dirt from tanks and pipes.

Filter blocking by such debris should diminish with time. It should not persist for more than 3 months after the full transition to low blend biofuels.

Where filters are blocked by emulsions, or by fungal growths, more serious problems are likely to exist and will require further investigation. The first action is to contact the supplier and arrange for them to take samples from the tank for analysis; the results of this will determine the course of action to be taken.

Regular checks after the initial delivery of the biofuel should be made on the internal pipework of the dispensers. If leaks start to occur it is essential to ensure the appropriate materials are used when replacing gaskets etc.

If the tanks on site have been relined at some time, signs in the under pump filter will be small pieces of perforated material appearing at this point if the lining has started to break down. If it does occur then a full tank inspection must be carried out before continuing to use the tank as it may have been relined because of leakage.

If hoses require changing then the types suitable for low blend biofuels should be used. Special biodiesel hoses should be used when the percentage of biodiesel is 20% or higher.

If above ground tanks are in use then the anti siphon valve must be checked regularly for correct operation. If the unit fails it must be replaced with a unit suitable for low blend biofuels.

8 ENVIRONMENTAL ISSUES

The first thing to ensure when moving to a supply of low blend biodiesel is to get the latest COSHH document from the fuel supplier. This will give all the detail of the risks involved and should be kept with the site Petroleum Register.

If spillage occurs ensure the product does not enter the ground, as it will cause ground water contamination.

Aquatic toxicity: if allowed to run directly into a local water course it may be harmful to aquatic organisms.

If a spillage does occur contact the local Environmental Agency who will assist in containing the spillage to a very local area rather than spreading via the local water courses to a main river.