RMI PETROL RETAILERS ASSOCIATION

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Guidance note for filling station operators on the introduction of E5 petrol and B5 diesel

Introduction

The UK Government's response to the European Directive 2003/30/EC is the Renewable Transport Fuel Obligation which will come into force on 15 April 2008. This places an obligation on road fuel suppliers to ensure that a target percentage of their total road fuel sales are biofuels. The target percentage starts at 2,5 % by volume in 2008/09 rising to 5 % by volume in 2010/11.

Standard petrol containing ethanol, or diesel containing fatty acid methylesters (FAME) are commonly referred to as E5 and B5 (for petrol and diesel blends respectively), but both can continue to be retailed as EN 228 petrol and EN 590 diesel respectively.

Key features

Although E5 and B5 remain within the requirements of EN 228 and EN 590 respectively, there are certain features of these fuels that differ from those that do not contain the biocomponent. These are described below.

Phase separation

Unlike petrol, ethanol is highly soluble in water. When the water content of the E5 blend reaches a critical level the ethanol component and associated water will separate from the E5 blend and form an ethanol/water phase. This will accumulate at the bottom of a tank leaving petrol (without the ethanol component) in the upper layer and is known as phase separation. If phase separation occurs the process is essentially irreversible, there is no straightforward means of reblending the ethanol back into the petrol at a filling station. In most cases, both phases will need to be taken off site for appropriate handling as a hazardous waste.

Microbial growth

Bacteria, yeasts and moulds can enter a filling station storage system through the distribution chain, via tanks, pipelines, filters, water and air. It is in the water phase that microbes survive, drawing nutrients from the fuel phase. With the addition of the FAME component in B5 blends, the nutrient sources available for microbes will be higher than in standard diesel. Microbial growth in the water phase can exacerbate localised corrosion, which may result in the blocking of dispenser filters and fuel lines.

Solvent properties

The solvent properties of E5 and B5 can have a cleaning effect on existing storage systems. This can cause a softening and loosening of any organic residues, dirt or scale present in the tank system. This loosening can bring this material into a suspended state, and can therefore increase the risk of filter blockage. This is particularly the case with B5, as methylesters are an established class of degreasing agents.

Electrical conductivity and corrosion

Because of the molecular composition of ethanol and FAME, and their stronger association with water, E5 and B5 have a greater electrical conductivity than standard gasoline and diesel respectively (E5 more so than B5). The biocomponent present in the blend can increase the risk of corrosion in existing filling station systems from galvanic and electrolytic reactions where particular material combinations may be present. This can in turn increase the risk of filter blockage.

Preparation before the introduction of E5 and B5

Metals, glass reinforced plastic (GRP), polyethylene and composites including combinations of other plastics can be used as materials in equipment in filling station storage, pipework and dispensing systems. Unless assurance has already been provided (i.e. by a competent filling station service contractor) that the equipment on site (including valves, flanges, gaskets etc) is compatible and of a suitable condition for E5 or B5 **the original equipment manufacturer should be contacted for advice.**

Further preparatory measures and actions to be carried out after the delivery of E5 and/or B5 are detailed in the checklist on the following page. For further advice you should contact your trade association or filling station service contractor.

This guidance note is provided as information only, and should not be considered mandatory. This information was produced by the Energy Institute's (EI's) Service Station Panel, comprising service station engineering and operating experts with representatives from the major oil companies, Association of UK Oil Independents (AUKOI), Forecourt Equipment Federation (FEF), Petroleum Equipment Installers and Maintenance Federation (PEIMF), Petrol Retailers Association (PRA) and United Kingdom Petroleum Industry Association (UKPIA). The information contained in this guidance note is taken from ***EI Guidance for the storage and dispensing of E5 petrol and B5 diesel at filling stations*** and is available from the EI's publications website www.energyinstpubs.org.uk. The EI's Technical Work Programme provides the industry with cost effective, value adding knowledge on key current and future issues affecting those operating in the energy sector, both in the UK and beyond. To find out more, visit www.energyinst.org.uk.

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Checklist for filling station operators

Before the introduction of E5 and/or B5		Fuel to be introduced	
Item	**Action**	**E5**	**B5**
Storage	Gain assurance that the equipment in the storage system is compatible and of a suitable condition.	✓	✓
	Ensure the storage tank, fill pipe, adaptors and associated equipment are free of water deposits, that sludge is removed from the tank bottoms and corrosion/loose material removed from tank walls. Cleaning to be carried out by a competent contractor.	✓	✓
	Storage systems to be water tight to avoid phase separation.	✓	
	For steel storage tanks with a liner, confirm that the liner is compatible.	✓	✓
	For storage tanks made of GRP check for confirmation that the GRP is compatible.	✓	✓
	Prior to the first delivery, remaining ethanol free product in the storage system run down to a minimum (if the tank has not already been emptied as a result of a cleaning operation).	✓	
	Re-label where necessary.	✓	✓
Dispensing	Gain assurance that the equipment in the dispensing system (including valves, flanges, gaskets etc) is compatible and of a suitable condition.	✓	✓
	Check/replace existing dispenser filters to reduce the risk of filter blockage.	✓	✓
Health & Safety	Inform the relevant licensing bodies of any impending works associated with the introduction of a blend.	✓	✓
	Update fuel Material Safety Data Sheets to reflect the new blends.	✓	✓
	Update H&S file and site records.	✓	✓
	Gain assurance fire extinguishers are compatible for use.	✓	✓
After the first delivery of E5 or B5			
Sampling	Take a fuel sample from the dispenser. Petrol and diesel fuels will normally be clear and bright, free from rust and debris and contain no free water. If there is marked discolouration or cloudiness in the dispenser sample, the fuel supplier should be contacted for advice. If appropriate, a competent contractor should be used to further circulate the fuel over a transportable filter back.	✓	✓
Continuing actions			
Storage	Check the system (fill pipes, adaptors etc) is water tight. A water dip may be carried out using a dipstick and an ethanol compatible water detecting paste. Any water detected will be due to phase separation. Initial checks should be carried out weekly for the first month and periodically thereafter.	✓	
	Gain assurance that water level gauging equipment on site is compatible and of a suitable condition for the blend.	✓	
	For steel storage tanks, consider using a pump maintenance contractor to check the under pump filter for small pieces of perforated lining material This will indicate whether or not any tank lining has started to break down.	✓	✓
Dispensing	Check the condition of dispenser filters and the function of the nozzle cut-off mechanism to ensure that filters remain clean enough to retain line pressure and cut-off function. Initial checks should be carried out weekly for the first month and periodically thereafter, with replacement if blockage occurs. If microbial infection is suspected, the fuel should be treated by a competent contractor.	✓	✓
	Increases in particulate rust passing through liquid meters may cause increased wear. Increased periodical checks should be made for accuracy and legal compliance.	✓	✓
	Check internal pipework of the dispenser system weekly for the first month and periodically thereafter for leaks due to component degradation.	✓	✓
Environmental controls			
Oil/water separator	Update procedures for oil/water separator handling – separator content will include an ethanol/water phase which may have a higher concentration of BTEX components. Ensure adequate disposal according to local and national requirements.	✓	

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