

Fuel Quality Directive Gas Oil Requirements

Introduction

1. EU Directive 2009/30/EC introduced a requirement that, from 1st January 2011, all gas oil (commonly known in the UK as 'red diesel') marketed for use in "non-road mobile machinery (NRMM)" i.e. "off-road equipment", tractors and recreational craft must contain no more than 10 milligrams of sulphur per kilogram of fuel (virtually 'sulphur free'). NRMM includes some agricultural equipment, forestry equipment, construction equipment, forklifts, portable generators, railway engines, and inland waterway vessels. In the case of gas oil for use in railway vehicles the introduction of sulphur free gas oil will be one year later (1st January 2012).
2. Sulphur free gas oil is needed to ensure the reliable operation of pollutant emissions control systems, which will be fitted to new off-road equipment from 2011 to meet EU emissions requirements. Without sulphur free fuel these systems would suffer progressive and irreversible damage, which would ultimately bring the equipment to which they are fitted to a halt. The introduction of sulphur free fuel will have a number of direct and indirect impacts of which users will need to be aware. However, with proper handling, any problems are likely to be quite limited. Indeed sulphur free gas oil has already been supplied in some regions of the UK, without any reported problems.
3. Legislative sulphur content requirements for gas oil for other purposes, such as heating or stationary equipment, will not change, however some fuel suppliers may, for logistical reasons, choose to supply sulphur free gas oil for these applications as well.

UK Gas Oil Supply

4. Prior to the introduction of sulphur free gas oil the UK fuel supply included two 'diesel' grades, road diesel and gas oil which was supplied for off-road equipment, coastal shipping, commercial heating applications and stationary equipment. Gas oil contained up to 1000 milligrams of sulphur per kilogram, but road diesel was already sulphur free. At present the oil industry has indicated that the sulphur free gas oil requirement is being met largely by supplying a new sulphur free gas oil grade, although in some limited cases road diesel may be supplied for use in off-road equipment. Duty rates applicable to gas oil are not affected by the introduction of sulphur free gas oil. Thus where fuel suppliers do supply road diesel for off-road equipment use a red excise marker dye will be added.
5. Because road diesel may contain some biodiesel (up to 7%), some off-road equipment gas oil is also likely to contain biodiesel from January 2011

onwards. Biodiesel blends of up to 7% are compatible with existing off-road equipment engines provided good housekeeping arrangements have been adhered to in storage of the fuel.

Fuel Storage

6. Because of these changes in fuel quality, increased care will be needed in the storage of sulphur free gas oil. The oxidation stability of this fuel may be poorer than that of previous gas oil. Over time oxidation can precipitate solids with potential to block filters in fuel distribution systems or in off-road equipment fuel systems. To minimise the likelihood of this occurring, it is recommended that users take particular care to ensure a fuel turnover period of once every 6 months and, in any event, no longer than once every 12 months.
7. Sulphur free gas oil containing biodiesel will also be more prone to bacterial contamination than previous gas oil. Bacterial growth can also potentially result in blockage of fuel filters and increased corrosion. Prolonged use of contaminated fuel could result in damage to engines. Bacterial growth can be prevented by eliminating water from fuel storage tanks and conducting monthly checks that tanks remain free of water. Where a bacterial growth outbreak has occurred, this can be addressed either by emptying and cleaning the tanks, or by seeking specialist help to tackle the outbreak with biocide additives and filtering.
8. Sulphur free gas oil containing biodiesel can be a better solvent than current gas oil. As a result it may pick up deposits already in fuel storage and dispensing systems and in fuel tanks on off-road equipment. To prevent those deposits from blocking filters, a one-time replacement of storage tank and off-road equipment fuel filters, outside the regular service interval, after 2 to 3 tank throughputs of sulphur free gas oil, is recommended.
9. Fuel seals in sight gauges on older fuel storage tanks may be incompatible with sulphur free gas oil and may require replacing. Users should examine sight gauges following the switchover to sulphur free gas oil. If there are signs of leakage they will need a one-off replacement of these seals. If users are having fuel storage tanks serviced it would be worth their while getting fuel seals replaced as a precaution.

Compatibility of Off-Road Equipment with Sulphur Free Gas Oil

10. Modern off-road equipment should have no problems running on sulphur free gas oil. However, it is possible that fuel seals and pipes in some older equipment may be incompatible with sulphur free gas oil and require replacing. Users should examine joints, seals and pipes in the fuel systems of their machinery following the switchover to sulphur free gas oil. If there are signs of leakage, seals and/or fuel pipes may need a one-off replacement.

Q&A

Q1. What is the change in gas oil quality requirements?

A1. From 14th January 2011 gas oil used in all diesel engined non-road mobile machinery (i.e. off road equipment), tractors and recreational craft will have to contain no more than 10 milligrams of sulphur per kilogram of fuel (virtually 'sulphur free').

Q2. Why are gas oil quality requirements changing?

A2. Sulphur free gas oil is needed to ensure reliable operation of new, cleaner off-road equipment engines being introduced from 2011 in support of EU air quality objectives.

Q3. What are the implications for gas oil users?

A3. Sulphur free gas oil will require improved fuel storage "housekeeping" arrangements. If you have tanks storing gas oil you will need to ensure that these are free of water and monitor them monthly to ensure that they remain so. It is recommended that you turnover the contents of the tank every 6 months, but in any event, no less often than every 12 months. If a bacterial outbreak occurs in your fuel you will need to empty and clean your tanks, or seek specialist help to tackle the outbreak with biocide additives and filtering. Where fuel tank location or geometry prevents their cleaning, bacterial growth will eventually be flushed through, but this is likely to require repeated changes of fuel filters to prevent blockages.

Users should also replace fuel filters on storage tanks and off-road equipment as a one-off exercise, after 2 to 3 fuel tank throughputs, to prevent deposits picked up by the new fuel blocking filters.

Users of older off-road equipment and storage tanks with sight gauges should check for any signs of fuel leakage. If leakage does occur the equipment will need a one-off replacement of any leaking fuel seals or fuel pipes.

Q4. What will sulphur free gas oil cost?

A4. Fuel prices fluctuate, but sulphur free gas oil is likely to increase the cost of gas oil by 1-2 pence per litre.

Q5. Are older engines compatible with this fuel?

A5. Most engines are fully compatible with this fuel. However, some fuel system components on older engines, in particular fuel seals and pipes, may not be compatible with sulphur free gas oil. Users of older equipment should examine

fuel systems in the months following the switchover and replace seals or pipes with compatible ones if there are signs of leakage.

Q6. How does this affect gas oil used for heating or static equipment?

A6. Regulations on the sulphur content of gas oil used for heating and in static equipment are not changing. However, some fuel suppliers may choose to supply sulphur free gas oil for heating and static applications as well as for off road equipment use. Users storing gas oil for use in both heating and off-road equipment may also choose to switch all of their fuel supply to sulphur free rather than install an additional fuel tank to store the fuels separately.

The same fuel storage and fuel system compatibility issues apply for heating and static applications as for off-road equipment, although these may be exacerbated by higher storage capacities, slower fuel turnover and older fuel seal materials than are typical on off-road equipment. Consequently particular attention should be paid to ensuring that fuel storage tanks are free of water and debris and that tank gauges and filters are compatible with sulphur free gas oil. Heating gas oil users may wish to refer to their fuel supplier or service company for guidance on fuel filtration.

Operators of standby emergency power generation equipment may wish to make specific arrangements with their fuel suppliers to continue to be supplied with higher sulphur gas oil with no biodiesel content in order to ensure that these issues are not encountered. Fuel meeting ISO 8217, in addition to meeting the normal gas oil standard BS 2869 class D, will have higher (1000 milligrams per kilogram) sulphur content and no biodiesel content.

Q7. How does this affect marine gas oil?

A7. Gas oil sold for use in inland shipping vessels and recreational craft operating on inland waterways must be sulphur free from January 2011. However, regulations on the sulphur content of gas oil used in sea-going vessels are not changing. It is not anticipated that suppliers of fuel for sea-going marine operations will switch to sulphur free gas oil, however users may wish to check this with their fuel suppliers. Fuel meeting ISO 8217 marine gas oil standard will remain at 1000 milligrams per kilogram sulphur content and will have no biodiesel content.

If using sulphur free gas oil the same fuel storage and fuel system compatibility issues would apply for marine applications as for off-road equipment, although these may be exacerbated by increased risk of water contamination and safety concerns.

Q8. How will this affect gas oil duty rates?

A8. The introduction of sulphur free gas oil does not affect fuel duty rates.

Q9. How do I know if I am buying heating gas oil or sulphur free gas oil for off-road equipment?

A9. Sulphur free gas oil for off-road equipment is not visually distinguishable from heating gas oil. Make sure your fuel supplier knows what use you need the fuel for. They will be able to tell you what standard the fuel they supply you with meets.

Q10. What are the British Standards for gas oil?

A10. Industry standards for gas oil for a range of applications are defined in BS 2869. The appropriate grades for different applications are;

Grade	Application
A2	Non-road mobile machinery/propulsion fuel
D	Heating & stationary power generation fuel

The standard for gas oil for sea-going marine applications is ISO 8217, fuel supplied to this standard does not contain biodiesel. Many fuel suppliers can supply a “dual grade” of gas oil meeting:

- Both ISO 8217 and BS 2869 grade D. This fuel will have a maximum sulphur content of 1000 milligrams per kilogram but no biodiesel content.
- Both ISO 8217 and BS 2869 grade A2. This fuel will have a maximum sulphur content of 10 milligrams per kilogram but no biodiesel content.

Q11. Where can I find more detailed information?

A11. There are a number of sources of more detailed information.

Your fuel supplier will be able to provide you with information on the fuel you are buying e.g. with which standards it complies.

Industry standards for gas oil are defined in British Standard BS 2869. Copies of this can be purchased from the British Standards Institution:

<http://www.bsi-global.com/upload/Standards%20&%20Publications/shop.html>

Information on the compatibility of different materials in fuel storage systems with fuel containing biodiesel can be found in Concawe FAME Handling Document:

“Guidelines for Handling and Blending FAME” Report No 9/09”

Guidance on fuel tank cleaning and preventing bacterial growth outbreaks is available from the Energy Institute;

GUIDANCE FOR THE INVESTIGATION OF THE MICROBIAL CONTENT OF
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REMEDIAL STRATEGIES

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