



1.0 Scope

This Technical Information Note deals with the importance of ensuring that fuel of the correct specification is used in mobile cranes to avoid fuel filter blockage and potential damage to the engine fuel and aftertreatment systems.

2.0 Background

The engines used in modern mobile cranes are becoming more sophisticated, consequently it is important that crane owners and users are using the correct fuel for their cranes, as specified by the crane manufacturer. This is becoming a particular issue with the introduction of EU Stage V engines for non-road mobile machinery.

There are currently four specifications of diesel fuel commercially available in the UK: -

- a) White road diesel that meets European Standard BS EN 590+A1:2017 – This fuel has a maximum sulphur content of less than 10mg of sulphur per kg of fuel (10ppm);
- b) Red diesel (Gas Oil) that meets European Standard BS EN 590+A1:2017 – This is available from a number of fuel distributors in the UK and has a maximum sulphur content of less than 10mg of sulphur per kg of fuel (10ppm);
- c) Red diesel (Gas Oil) that meets British Standard BS 2869 Class A2 – This fuel has a sulphur content of less than 10mg of sulphur per kg of fuel (10ppm);
- d) Red diesel (Gas Oil) that meets British Standard BS 2869 Class D – This fuel has a maximum sulphur content of 1000mg of sulphur per kg of fuel (1000ppm).

In 2011, it became a requirement that all fuel used in non-road mobile machinery must comply with EU Ultra Low Sulphur Diesel (ULSD) regulations and must therefore contain no more than 10mg of sulphur per kg of fuel. Since white road diesel (DERV) was already ULSD compliant at this time, it is often believed that the specifications for red diesel and white diesel have been identical since the regulation change. **This is not the case.**

There are two recognized standards of red diesel that are currently in use: BS 2869 Class A2 and BS 2689 Class D. Class A2 has a maximum sulphur content of 10ppm (10mg/kg) and is used for excepted vehicles, including mobile cranes, while Class D has a maximum sulphur content of 1000 ppm (1000 mg/kg) and can only be used for heating or static generators.

Neither of these standards however, meet the specification for white road diesel (BS EN 590:2013+A1:2017, *Automotive fuels. Diesel. Requirements and test methods*). One of the key differences in specification between Class A2 red diesel and road (white) diesel is in the fuels' cetane values. BS EN 590 has a higher cetane value than BS 2869, which means it has a shorter ignition delay and therefore burns more efficiently and cleanly, leaving fewer deposits in the engine's fuel injection combustion chamber.

Some examples of the problems that can arise from the use of incorrect fuel are shown in Section 4.0.

3.0 Recommendation

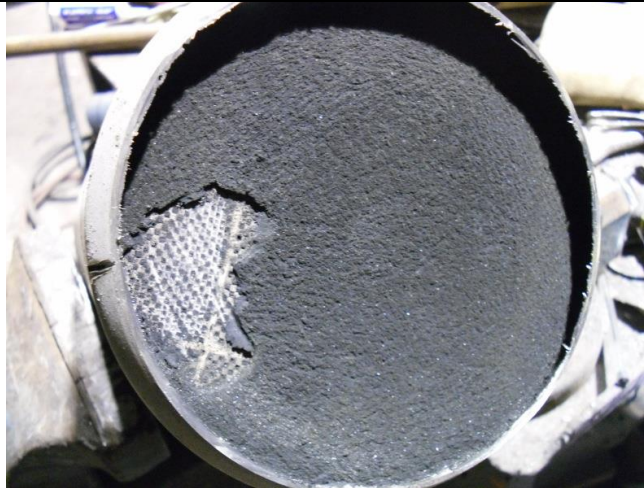
With crane manufacturers continuously improving the technologies used within crane diesel engines, crane owners and users are advised to check that the fuel obtained complies with the crane manufacturer's specification. Failure to do so may result in costly engine breakdowns and crane recovery costs, which are unlikely to be covered by the crane manufacturer's warranty.

Where cranes are on site for long periods or are hired on a non-operated basis, it is essential that the crane user (hirer) is made aware of the correct fuel specification by the crane owner, as the user will generally be responsible for refuelling the crane.

TIN 108

Red Diesel (Gas Oil) Fuel Specifications for Mobile Cranes

4.0 Examples of the problems that can arise from the use of fuel of the wrong specification



Blocked Particulate Filter



Blocked Exhaust Gas Recirculation Valve



Damaged Injectors



Blocked Fuel Filter