FuelClear™ M15 Fuel Biocide – No Harm Testing with EN590 Diesel

Overview

Testing was carried out to determine if FuelClear™ M15 exhibited any adverse effects on fuel properties or performance when used in an EN590 diesel fuel.

Dose Rate

FuelClear™ M15 was tested at significantly higher concentration than recommended in EN590 diesel fuel to assess potential negative impacts on performance. This exceeded the standard testing scope, which focuses on specific properties outlined in the EN590 specification. Additional tests were conducted on other fuel properties that are crucial for performance, even though they are not explicitly included in the EN590 standard. The experiment involved testing both untreated base fuel and fuel treated with FuelClear™ M15 at a high concentration of 5,000 ppmv (mg/kg).

Low Temperature

FuelClear™ M15 exhibits exceptional performance at low temperatures. Testing using industry-standard procedures (ASTM D5772, IP15, IP309) demonstrated that FuelClear™ M15 does not compromise diesel fuel's low-temperature operability, ensuring reliable engine starts and smooth performance in cold weather.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Cloud Point (ASTM D5772)	-22 °C	-22.5 °C
Pour Point (IP15)	-34 °C	-32 °C
Cold Filter Plugging Point (IP309)	-23 °C	-22 °C

Appearance

Fuel treated with 500mg/kg of FuelClear™ M15 remained transparent and free of sediment, matching the visual characteristics of untreated fuel and complying with EN590 clarity and brightness standards.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 500ppmv	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Appearance	Clear & Bright	Clear & Bright	Slightly Hazy

Cetane Number

FuelClear™ M15's addition at varying concentrations showed no significant change in Cetane Number compared to untreated fuel, all exceeding the EN590 minimum of 51 when measured using ASTM D613.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Cetane Number (ASTM D613)	53.1	54.4

Copper Corrosion

Testing using the ASTM D130 procedure verified that FuelClear™ M15, even at a high concentration of 5000mg/kg, does not exacerbate copper corrosion in diesel fuel. This ensures compliance with the stringent EN590 Class 1 requirement, as both untreated and treated fuel achieved the top rating of Copper Strip Classification 1.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Copper Corrosion (ASTM D130)	1a	1b

Oxidation Stability

Testing using the ASTM D2274 procedure confirmed that FuelClear™ M15 does not compromise diesel fuel's resistance to oxidation. All tested samples, including the base fuel, achieved results within the acceptable margin of error, demonstrating compliance with the EN590 limit of 25 g/m3.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Oxidation Stability (ASTM D2274)	0.1 g/m^3	0.2605 g/m^3

Lubricity

FuelClear™ M15 showed excellent lubricity performance across various concentrations in the IP450 test. All treated samples, along with the base fuel, yielded results significantly below the EN590 limit of 460µm, ensuring optimal engine protection.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Lubricity (IP450)	370 µm	385 µm

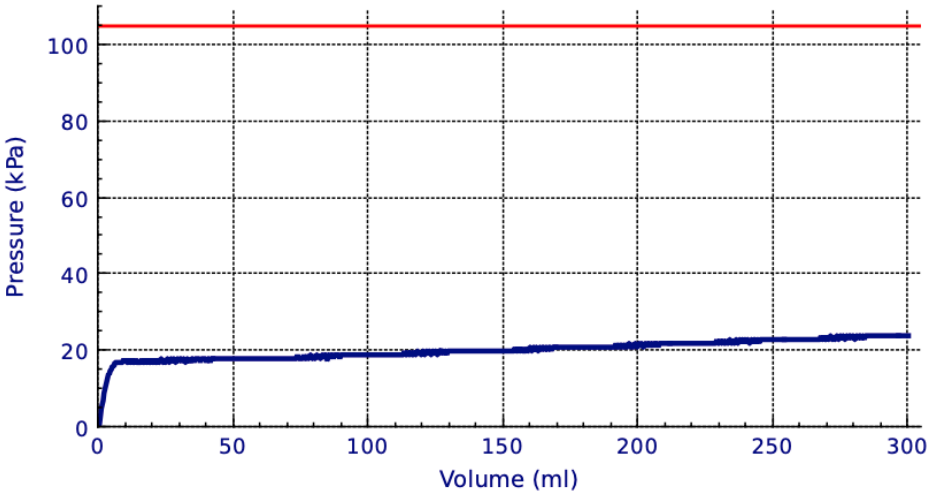
Conductivity Performance

Evaluation of FuelClear™ M15's effect on conductivity using ASTM D2624 in diesel fuel (with a typical anti-static refinery additive at 0.5mg/l) revealed a slight decrease. However, all results were within the test's error limits, suggesting no meaningful impact on conductivity performance.

Test	Base Fuel	Base Fuel + FuelClear™ M15 @ 5,000ppmv
Conductivity (ASTM D2624)	76	58

Filter Blocking Tendency

Testing using the IP387 procedure at 19°C confirmed that FuelClear™ M15 does not compromise diesel fuel's filterability with a test result of **1.03**. All tested samples, including the base fuel, achieved results within the acceptable margin of error for EN590 diesel fuel. Graph output below.



Conclusion

The results above show that FuelClear™ M15 does not exhibit any adverse effects in an EN 590 diesel fuel with respect to fuel Specification limits.